The Chemical Age

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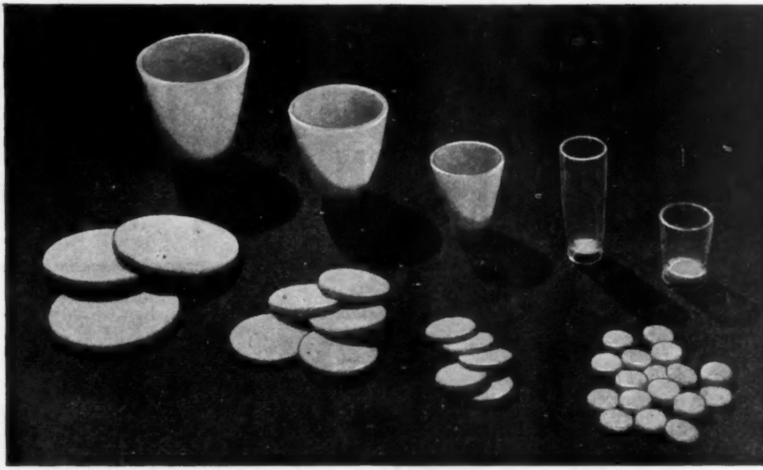

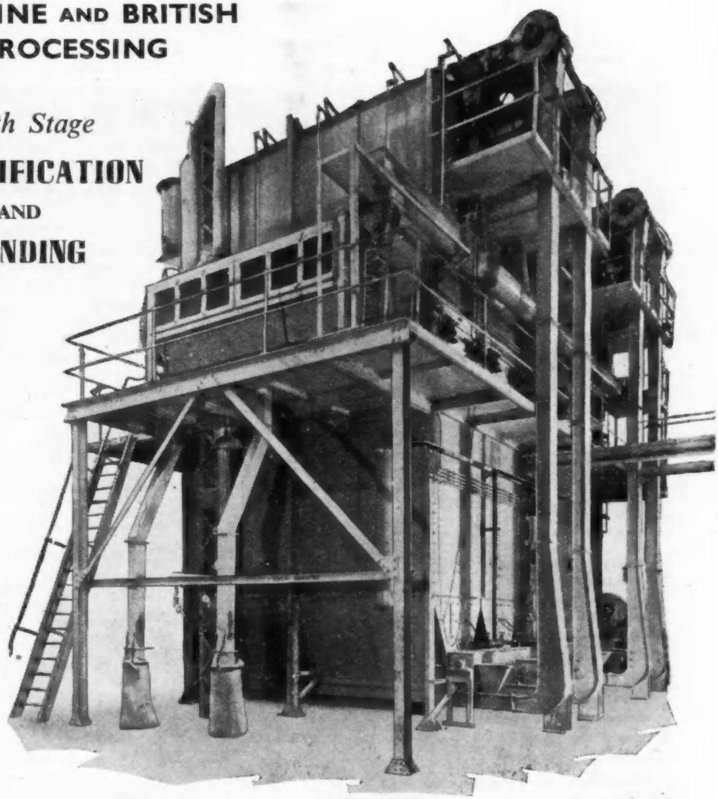


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The Chemical Age

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Raw Materials and the Chemist

EARLIER this month the Glasgow section of the Society of Chemical Industry heard a paper by Professor A. K. Cairncross with the simple and direct title, 'Raw Materials and the Chemist,' a refreshing change from the theme of our immediate times, 'Raw Materials and the Politician.' Professor Cairncross gave figures comparing the world's raw material situation in 1928/29 and 1948/49 and showed that for all major materials (those produced in quantities not less than 100,000,000 tons per year) prices have risen much more sharply than production. It might easily be deduced from this that the great fault of our own time is putting secondary things first, creating new demands or increased demands for basic raw materials but devoting little attention to the means by which production of those raw materials may be expanded. But such a deduction is all too facile. Indeed, it should surprise no one that prices of raw materials have risen more than their output tonnages. In the period considered by Professor Cairncross the population of Great Britain has risen by between 2 and 3,000,000, a matter of four to six per cent; but this country's population is expanding most moderately compared with the rates at which many other national populations are growing. Day by day the number of raw material consumers increases, not trivially but in hundreds of thousands. Because food is man's primary requirement the consequences of world population expansion are usually discussed in terms of nutrition; but all the basic raw materials are similarly affected.

Nor is this all. The development of backward countries and areas brings with it rising standards of living, and this automatically involves a greater consumption of raw materials *per capita.* This factor and the world's population expansion inevitably swell the total demand with a pressure that cannot be balanced by increases in output. However many evasive devices operate within a country's internal economy, the old economic law of supply and demand still rules in international distribution. Raw material prices have quite naturally risen and there is no reason to suppose that they will not continue to rise.

It was the first and principal plea of the United Nations' Food and Agricultural Organisation that all countries should

grow the maximum possible proportion of their own food needs. A similar plea in regard to raw materials is no less imperative even if its practical interpretation must be more complex. National boundaries and square mileages have not been determined by idealistic principles or mineralogical equity. Some countries seem luckier and much bigger than others; a few seem to have been more enterprising in exploring their share of the world's crust.

For Britain the change in the world food situation has been severe enough. A dozen years ago we could choose our purchases from various other countries' surpluses and we could regard our own agriculture as a semi-pensioned industry. But we have been able to revive our agriculture and we possess an exceptionally good soil and climate; indeed, we have yet to find out how much food we can produce if real fear of starvation ever became the grim mother of necessity. We are not nearly as well placed to deal with our raw material situation. Traditionally a country that imports raw materials and turns them into finished articles, we have a most unfavourable 'raw material balance.' We have no semi-derelict raw material producing industry to turn to and revive, nothing to parallel our pre-1939 agriculture. Coal, once our outstanding exportable raw material, is no longer producible in sufficient quantities to meet our own rationed and allocated needs. Internationally we are buyers of coal—when and if our purse permits. When the post-Korean scramble for raw materials was at its height, it was often said that we had tin and rubber to offer in return for other materials we ourselves needed. But it was not Cornish tin nor was it rubber from Kentish plantations!

Our national future depends on the long-term efforts we are prepared to make in finding and developing new raw material resources either at home or in safely accessible colonial territories; on our ability to use substitutes made from those raw materials we actually possess; and not perhaps least on our determination to avoid waste. Short-term measures to keep vital raw materials flowing towards our ports are purely expedient and will in many cases have no influence upon the eventual crisis—dollar credits, international allocations, 'barter' with Malayan tin and rubber, these are devices that may not always be practicable or acceptable even if they are currently helpful. Some months ago a leader in this journal called for a 'Chemical Cabinet'; were such an organisation in operative existence, the long-term problem of raw material supplies would be the highest priority item on its agenda. What proportion of our national scientific brain force is at present applied to the problem of Britain's raw material needs in, say, 1960?

On Other Pages

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Notes & Comments

Research Statistics

RECENT report (*Chemical Week*, 27 October) provides a variety of figures for assessing the research efforts of the U.S. chemical industry. In twenty years the number of workers employed in research for the chemical and allied industries (excluding petroleum, coal, and rubber) has risen from 10,000 to 32,000. Graphical presentation shows that the increase has been remarkably even in pace—through the depression of the 'thirties, through war, and through the post-war years since the line is straight. This, indeed, is true of industrial research as a whole in the United States—the growth of total research staff numbers for all industries also shows a straight-line ascending graph from 1927 to 1950. Of the 32,000 workers employed in chemical industry research in 1950, a breakdown shows that just under 50 per cent are professionally qualified with the remainder carrying out ancillary duties. In 1938, 4,850 chemists were employed; in 1950, this group had risen to 9,399. The similar figures for engineers were 1,094 and 3,474. No doubt, however, in the U.S. as well as here it is impossible in many cases to draw distinction between chemist and chemical engineer.

Anglo-American Comparison

IT is not wholly logical to relate research costs with business turnover for there is always a long time-gap between the dividend paid by research and trading facts at the time the research is done; however, the ratio does show to what extent a business or industry ploughs back its income into research for the future. The American figures (based on estimated research costs since real figures from different firms are not known) show that in 1927 under half a cent per dollar-value of output was spent on research, in 1938 about one cent, and in 1950 one-and-a-half cents, i.e., 1.5 per cent of turnover. Some comparison, admittedly on a very rough basis, can be made here with our own chemical industry's research effort. The A.B.C.M Report for 1949 gave an estimate for total output value (1948 year) of £250,000,000; the research and development activities of the industry then occupied 10,100 persons (of whom 3,000 were professionally qualified) at an annual cost of just under £8,500,000. This would indicate a ratio of 3.4 per cent of turnover spent on research and development by the British chemical industry, but before assuming that this implies a greater proportional effort than is made in America it must be remembered that in 1948 raw material shortages were keeping the British industry's output much below capacity, and also that we have no reliable break-down in the total research costs between genuine research and development. Similarly, it must be realised that the very high output of the U.S. industry, especially when measured in dollars during a time of fast-rising prices, tends to dwarf the ratio adversely. Nevertheless, when all these allowances have been roughly made, there would seem to be much less difference than many would expect between the U.S. and British industries in the proportions of their incomes which they set aside for research.

Food for Thought

THE lively interest being shown at the present time in that simplest of living creatures—chlorella, a member of the algae family of unicellular fresh water plants—brings yet one day closer the time when we could all be carrying our meals around in small paper packets and taking a few tablets every four hours. This betrayal of the palate is taking place through the agency of what our forefathers in their rugged and unenlightened way would have called 'pond scum.' The bane of a nanny's life when her charge insisted on paddling in muddy woodside pools has been raised in status from something to be scrubbed off as quickly as possible to a 'rich source of food containing 45-50 per cent protein, 15-20 per cent fats and 20 per cent carbohydrates.' Nanny would have been very surprised. Candidly, the prospect of

living for ever on bread smeared with a thin layer of yeast-like stodge—rather like a railway meat paste sandwich, one imagines—is about as exciting as last week's suet pudding. The news that scientists have not only managed to exist for a week on this panacea, but actually felt 'as though they had had a good meal' after each dose, gives rise to grave disquiet, not to say alarm. What will happen to the delicacies of the table, the roast Scotch sirloin, the lobster mayonnaise, the asparagus and strawberries, the omelettes Espagnoles, and even the plain fish and chips if all these are to be replaced by two thin slices of bread and a communal trough of algae? The consequences of such an act do not bear thinking about. If the armies of the future are going to get algae for breakfast, dinner and tea, it is even odds that they will face the enemy after their marches with greater enthusiasm than they face their meals. There is only one foreseeable advantage for this new diet—guests will be able to sleep in the kitchen.

New Detergent Plant

'Teepol' Manufacture in France

Claimed to be the most modern of its kind in Europe, a plant for the manufacture of 'Teepol' is now operating at Petit-Couronne, near Rouen, France. Its designed capacity of 25,000 tons per annum of a proved and widely useful detergent will be of immediate benefit to the French industrialist and housewife alike. An outstanding feature of the new plant is the high degree of automatic operation, which enables a staff of only 70 to run a highly technical installation.

Adjoining the existing Shell Refinery, the new plant represents the first fruits of an association between Shell and the French chemical group—Saint-Gobain. A combined manufacturing company named Société Shell Saint-Gobain, has been set up in the joint interest. The experience gained from the British and Dutch 'Teepol' plants has been incorporated at Petit-Couronne and the special feedstock (a cracked petroleum wax) is derived from Shell refineries.

The valuable property of 'Teepol' of 'making water wetter' is already recognised in nearly all industries where water is used. This versatile detergent contributes directly to the national and world economy by replacing natural fats that would otherwise have been denied for use as foodstuffs.

New Laboratories for Food Research

CO-OPERATION between scientists and food manufacturers has never been so vital to the welfare of nations as it is to-day. The urgent problem of producing and preserving more food for an increasing world population, and the need to continue efforts to control pests which destroy crops or may infest imported food, are only two examples which help to emphasise the significance of the new laboratories of the British Food Manufacturing Industries Research Association at Leatherhead, which were officially opened by Lady Engledow. wife of Sir Frank Engledow, C.M.G., F.R.S., Drapers' Professor of Agriculture, Cambridge, and president of the association, on Thursday, 8 November.

Before the opening, the president and Lady Engledow were welcomed by Lt.-Col. G. R. Harding, D.S.O., M.B.E., chairman of the association, who said that everyone would appreciate that the present times and conditions were very difficult ones in which to carry out a project such as the building and equipping of new laboratories, nevertheless, although they were strictly utilitarian, the project had been accomplished.

A warm tribute was paid to the loyal and untiring permanent staff by whom the laboratories had been planned. Colonel Harding first mentioned Mr. T. Macara, the association's original director, and said how much was owed to his organising ability, prescience and knowledge in the early days. Next he expressed appreciation of the work of Dr. L. E. Campbell, who succeeded Mr. Macara, but had now gone to the Food and Agricultural Organisation, Rome. Then he came to the present director of research, Dr. F. H. Banfield and his staff, mentioning particularly Mr. C. L. Hinton, who had been with the association since its inception in 1920, and Mr. G. H. B. Davis, its secretary, who had steered them through many difficulties and continued to be a tower of strength.

The new laboratories, said Sir Frank in reply, were an outward and visible sign of the support for research afforded by the food manufacturing industries which were fully cognisant of how fundamentally dependent they were on the use of science.

It was three or four years now since the council had first debated the building of new laboratories, and decided that despite the expense and hard work involved, if adequate scientific research was to be maintained, larger buildings and better equipment were necessary. If that was so some years ago, the case for the project, now completed, was even stronger to-day.

Problems and difficulties to be faced to-day were, however, bad—like the weather. But, it was no good ignoring them, they must be faced up to. It would be foolish to stand out of doors and get drenched, while trying to pretend that it was not raining. So we must meet our problems squarely. The new laboratories, he felt sure, would soon justify the work and expenditure that had been put into them, and they would help to preserve a connection all the way down between the various food

manufacturing firms and all who assisted in the association.

After being presented with a pair of scissors in a case inscribed to commemorate the occasion, Lady Engledow cut a ribbon stretched across the entrance, and expressed the hope that all who worked in the laboratories might have happiness and success in all their undertakings.

Mr. F. N. Hetherington, on behalf of the council and staff, thanked Lady Engledow and Sir Frank for travelling all the way from Cambridge for the opening, in spite of the unpleasant weather conditions.

A tour of the building which comprises lower ground floor, ground floor, and first floor showed the wide scope of the association's activities. One room was devoted to the control of insects and pests, some specimens of which were on view, and to methods by which they might be detected.

In another section investigations in connection with the manufacture of jam were displayed, and methods of assessment of new fruits for commercial jam making were demonstrated. Causes of the breakdown which takes place in strawberries preserved in sulphur dioxide for use in jam making were under investigation and methods of investigating enzyme activity of the fruit itself, and in the mould associated with it, were being developed.

Research concerned with a wide range of foodstuffs and raw materials was being conducted in the general research laboratory, the largest in the building. Among the instruments on view were: a Ferranti portable viscometer; a Dobbie-McInnes 'poisemeter', an electrical viscometer designed to provide instantaneous indications of viscosities of liquids at any point in an industrial plant; and a Lovibond-Schofield tintometer enabling colours to be matched by using standard slides of two colours only.

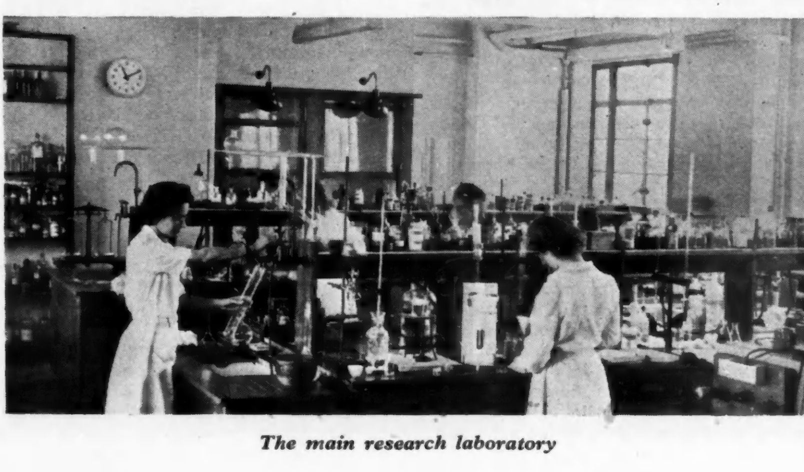
Apparatus included that for the determination of air content of margarine and compound cooking fat; hydrogenation on a laboratory scale of ground nut oil; determination of moisture in foods and melting points of fats; and the measurements of strength of gelatine and agar gels.

A variety of machinery and plant for carrying out manufacturing operations on a small scale forms the equipment of the technical laboratory. The plant is left as mobile as possible so that a machine may be moved easily and replaced by another as the investigations demand. A boiler supplying process steam at 80 lb. pressure has recently been installed.

Work of the bacteriological department was explained in a number of exhibits which showed how micro-organisms are studied and the methods of controlling their undesirable and desirable activities.

An important section of investigation was devoted to the separation and shrinkage of meat and fish pastes in small jars, and a vacuum gauge for testing canned goods was also on view.

Experiments were also in progress in this



The main research laboratory

The technical laboratory

section for testing various gums and stabilisers employed in the manufacturing of sauces to prevent sedimentation.

The library contains about 1,000 scientific and technical books and about 90 periodicals are taken regularly.

Rapid Estimation of TiO_2

A Faster Analysis of Ilmenite

A METHOD not generally practised for the rapid determination of TiO_2 in ilmenite ores has recently been put forward by W. A. Tooke, B.Sc., A.R.I.C., Chief Chemist of the Malaya Geological Survey. While not new in principle, it is more rapid than the more usual method of titration against ferric alum. It is not suitable for ilmenite ores carrying columbite.

The procedure is as follows:—Fuse 0.25 g. of the finely ground ore with 2-3 g. potassium bisulphate and dissolve the melt in 60 ml. hot 1 : 1 HCl. Filter off insoluble quartz, cassiterite, zircon, etc., catching the filtrate in a 500 ml. flatbottomed boiling flask and washing with cold water. Dilute the filtrate to about 125 ml., heat to about 60°C., introduce a 2-2½ g. strip of aluminium ribbon, and close the flask with a rubber stopper carrying a short-length of glass tubing drawn out to a jet at the upper end.

Allow reduction to proceed until the yellow iron colour is replaced by the violet of reduced titanous chloride (about 10 minutes). Add 30 ml. concentrated HCl, replace the stopper and boil until the aluminium is just completely dissolved. Remove from the hotplate and immediately attach to a CO_2 generator (through an H_2SO_4 bubbler). Cool momentarily by slowly immersing up to the neck in a bath of water for approximately one-half minute. Remove from the bath, and as soon as CO_2 ceases to be sucked in through the bubbler, detach and close the jet in the rubber stopper by a short length of rubber tubing, plugged at one end by a small piece of glass rod.

Remove the stopper and immediately titrate while hot (above 60°C.) to blue colour with methylene blue (12 g. per litre), keeping the tip of the burette well down inside the neck of the flask. The end-point is a change from yellow through purple to blue, and after two or three practice runs can easily be determined to one drop. A discrepancy of 0.05 ml. in duplicate runs is unusual. The methylene blue should be standardised against 0.2 g. pure TiO_2, which has been fused with potassium bisulphate, dissolved and reduced in the same way as the ore. In a brown bottle in a dark cupboard it keeps well, but for accurate work should be frequently standardised. (1 ml. = approximately 0.005 g TiO_2.)

Atomic Central Heating

Successful Installation at Harwell

THE first successful adaptation of atomic power to supply heating for buildings was announced last week by the Ministry of Supply.

Since Monday, 19 November, some 80 offices at the Atomic Research Establishment, Harwell, have been heated by a central heating plant drawing its heat from Bepo, the large experimental atom pile.

Hot water flowing through the pipes is obtained by placing a heat exchanger in the outlet air duct of the pile's air-cooling system. Here there is a by-pass fitted with a damper which can be adjusted to vary the proportion of the air flow passing through the heat exchanger.

From the exchanger hot water is circulated in a closed circuit by a small pump to a secondary water-to-water heat exchanger. This supplies hot water for space heating and domestic water supplies. There is no danger from radioactivity and the water can be safely used for washing.

At present the air temperature at the primary heat exchanger is 135°F. and the water is heated to 130°. Modifications to the pile are in progress, and when completed next year, it is expected that these temperatures will be considerably increased.

The heat output designed for the first building is 1,000,000 B.Th.U. an hour, but for the final installation the maximum output will be 7,000,000 B.Th.U. an hour. The floor area now being heated is 32,000 sq. ft. and the volume of space 330,000 cu. ft.

Tests of the installation proved completely satisfactory.

Sulphuric Acid Totals

Smaller Consumption & Improved Stocks

PRODUCTION of chamber and contact sulphuric acid and oleum in the United Kingdom in the quarter ended 30 September, 1951, reached a total of 514,600 tons compared with 442,968 tons in the corresponding period of last year.

Consumption, however, with a total figure of 421,733 tons was 23,579 tons less than in the same period of 1950.

These figures and the following tables are from the summary of monthly returns for the United Kingdom issued by the National Sulphuric Acid Association, Ltd.

RAW MATERIALS
(Tons)

	Pyrites	Spent Oxide	Sulphur and H_2S	Zinc Concentrates	Anhydrite
Stock, 1 July, 1951	71,900	216,745	78,471	25,327	275
Receipts	68,165	78,662	64,296	53,678	47,781
Adjustments	+2,353	+163	—	—	—
Use	51,328	58,771	68,044	33,901	48,056
Despatches	13	5,483 344*	72	681	—
Stock, 30 Sept., 1951	91,077	230,972	74,651	44,423	—

* Used at Works for purposes other than sulphuric acid manufacture.

Note.—The above figures include production at Government plants where those plants are reproducing acid for trade purposes.

CONSUMPTION—UNITED KINGDOM
(1 July–30 September, 1951)

Trade Uses	Tons 100% H_2SO_4
Accumulators	2,033
Agricultural purposes	6,788
Bichromate and chromic acid	3,655
Bromine	4,169
Clays (Fuller's Earth, etc.)	2,338
Copper pickling	413
Dealers	3,855
Drugs and fine chemicals	3,249
Dyestuffs and intermediates	21,260
Explosives	4,386
Export	575
Glue, gelatine and size	123
Hydrochloric acid	14,610
Hydrofluoric acid	2,858
Iron pickling (including tin plate)	19,462
Leather	1,133
Metal extraction	477
Oil refining and petroleum products	17,750
Oils (vegetable)	2,042
Paint and lithopone	34,564
Paper, etc.	936
Phosphates (industrial)	669
Plastics, not otherwise classified	6,569
Rayon and transparent paper	57,471
Sewage	2,608
Soap and glycerine	3,864
Sugar refining	131
Sulphate of ammonia	63,270
Sulphates of copper, nickel, etc.	4,311
Sulphate of magnesium	1,266
Superphosphates	85,824
Tar and benzole	4,249
Textile uses	4,697
Unclassified	40,128
Total	421,733†

† Includes 20,558 tons of imported acid.

PRODUCTION OF SULPHURIC ACID AND OLEUM
(TONS of 100 per cent H_2SO_4)

	Chamber only	Contact only	Chamber and Contact
Stock, 1 July, 1951	28,625	36,340	64,965
Production	150,599	252,067	402,666
Receipts	23,120	21,204	44,324*
Oleum feed	—	1,280	1,280
Adjustments	−141	+34	−107
Use	83,204	119,322	202,526
Despatches	86,152	153,409	239,561
Stock, 30 Sept., 1951	32,847	38,194	71,041
Total capacity represented	199,870	314,730	514,600
Percentage production	75.3%	80.1%	78.2%

* Includes 7,481 tons of imported acid.

East German Five Year Plan

Chemical Plant for Soviet Satellites

A FIVE Year Plan to cover all economic activity in 1951-1955 has now been given legal effect in the Soviet-occupied zone of Germany. A provisional plan was drawn up in 1950 and put into force in January last, but unexpected difficulties have caused the initiators of this plan, which is based on the Soviet pattern, to make important alterations in the original scheme.

The Soviet-occupied zone of Germany possesses an important chemical industry. The chemical works at Leuna, the buna works at Schkopau, the electro-chemical and fertiliser plants at Bitterfeld and Piesteritz, the lignite distillation and processing works at Boehlen, Espenhain and Zeitz, the chemical factories at Wolfen, and the Fahlberg-List works at Magdeburg are still centres of great activity. On the other hand, there were no important producers of chemical plant and equipment in Eastern Germany, apart from the world-famous glassworks at Jena, Thuringia, and the Soviet zone authorities have therefore made a special point of expanding the production of chemical equipment. The heavy engineering industry is under orders to extend its production considerably, and heavy chemical plant occupies an important place in its production programme. A total of Dm. 1,700,000,000 (equivalent, at the official rate of exchange, to about £150,000,000) is to be invested in East German chemical industries by 1955, and East German engineering works are also to export chemical plant, boilers, etc., in substantial quantities to Poland and other Soviet satellites. These deliveries to eastern countries will take place under long-term trade agreements, most of which will run until 1955 as does the Five Year Plan.

Production Doubled by 1955

The production of chemicals in Eastern Germany is to be doubled by 1955; compared with the production in 1950 there is to be an increase of 104.4 per cent, but this figure is not very instructive as absolute figures of the 1950 output have never been officially released. Special efforts are to be made to increase the production of basic chemicals, synthetic rubber, synthetic motor fuel, and fully synthetic fibres. The production of nitrogenous fertilisers is to rise to 130 per cent of 1950, that of phosphates to 580 per cent, synthetic rubber to 176 per cent, synthetic petrol to 204 per cent, diesel oil to 148 per cent, sulphuric acid to 194 per cent, caustic soda to 200 per cent, calcined soda to 646 per cent, and soap to 290 per cent.

Raw Material Shortage

Production of sulphuric acid has hitherto been hampered by shortage of raw materials. It is hoped to increase production materially from anhydrite at Wolfen. To save sulphuric acid, apatites imported from the Soviet-Union are treated with residues from the potash industry. Two new soda factories and a new electrolytic alkali plant were to have been erected in Saxony-Anhalt according to earlier reports. These have not been referred to recently, nor has the beginning of construction work on these plants been reported. But there is no doubt that additional plant will be needed to achieve the projected increase in production, especially of soda ash. In the meantime substantial tonnages of basic chemicals including alkalis are to be imported from Poland in exchange for potash, nitrogenous fertilisers and fine chemicals.

Special attention is to be devoted to the production of rayon and synthetic fibres, as raw materials for the textile industry constitute one of the most serious shortages in Eastern Germany. Not only is the production of Perlon to be increased, but Nylon and Orlon are to be manufactured too. Similarly, great importance is attached to increasing the production of buna in the Soviet-managed works at Schkopau, not only for local needs but for exports to eastern countries. Plastics are to be made on an increasing scale for replacing non-ferrous metals. The non-ferrous metal industry has been instructed to increase the yield of tin, nickel and other metals from domestic ores mined at Mansfeld and in the Ore Mountains by using new dressing methods.

The Five-Year Plan contains an important admission: The coal output, which may be estimated now at about 1,000,000 tons a year, is to be increased by no more than 250,000 tons annually in the last two

years of the plan. All the efforts to increase coal production in the Zwickau-Oelsnitz district, the only coal deposit of any importance in the Soviet zone, have failed to yield any results. Various industries, including the chemical trades, have therefore been instructed to concentrate on making the best possible use of the abundant supplies of lignite. Iron and steel furnaces, power stations, gasworks and other consumers are to switch over to lignite, lignite briquettes and lignite coke wherever possible. It is, however, hoped to obtain some relief in the grave fuel situation by imports of coal and coke from Poland.

It has not been stated what proportion of the additional chemical production will be at the disposal of local consumers, but there is reason to assume that a growing proportion of the output will be sent abroad, chiefly to eastern Europe. The long-term production plans and trade agreements prepared in the satellite countries have been co-ordinated, insofar as this was possible, and eastern Germany's part in these Soviet-inspired and controlled arrangements in the chemical field seems to be that of supplier of chemical plant, intermediates and finished products. The pharmaceutical industry whch normally had an important export business has been instructed to develop new products based on indigenous materials and to expand the export trade. Pharmacists have at the same time been warned that those who ignore medicines made in the Soviet zone would be punished. A growing export business is also to be developed in potash salts, but these will probably be used as a counter in foreign trade with western countries, especially the Scandinavian States, which can provide eastern Germany with much-needed essential commodities. Potash is also to be exported to Poland and other eastern countries.

Two New ICI Products

TWO new products are being exhibited by Imperial Chemical (Pharmaceuticals) Limited at the London Medical Exhibition in December 1951. They are 'Cetavlex' Cream and 'Avloprocil' N.A.

'Cetavlex' Cream contains 0.5 per cent Cetrimide B.P. in a colourless water-miscible cream base. Cetrimide B.P. is the active principle in 'Cetavlon,' a cationic surface-active agent with powerful detergent and bactericidal properties, which is well established in medical use. 'Cetavlex' Cream has a variety of uses as an antiseptic application for preliminary treatment of wounds and burns, treatment of skin infections, and as an additional safeguard against infection of surgeons' hands after the 'scrub-up.'

'Avloprocil' N.A. is a fortified procaine penicillin G preparation, which readily forms an aqueous suspension when sterile water is added. It is valuable for the treatment of acute and chronic infections where an initial high concentration of penicillin in the blood, together with a sustained therapeutic level, is requred.

Beside these two new products, there are the well-known ranges of anaesthetics, analgesics, antimalarials, antiseptics, parasiticides, penicillin preparations, sulphonamides, sulphones, and thiosemicarbazones, made by Imperial Chemical (Pharmaceuticals) Limited.

Cobalt^{60} in Cancer Therapy

THE first deep therapy unit for the treatment of cancer containing Cobalt^{60} as a source was handed over on 12 November to the Ontario Cancer Foundation at Victoria Hospital, London, Ontario. It was the first of a number to be produced for hospitals in Canada, the U.S. and elsewhere, and cost in the region of £18,000. The source is one ounce of cobalt which has been processed for one year in a nuclear reactor at the Canadian atomic research establishment at Chalk River, and an amount of radium producing equivalent radiation—if such an amount of refined radium existed—would cost in the region of £180,000. There are now two piles at Chalk River, of which the second (NRX) reactor is stated to have the highest neutron flux of any in the world. A new reactor being built is aimed at having a high density comparable with it. Cobalt^{60} has great uses in industry as a source of α-radiation for the examination and non-destructive testing of materials as well as the measurement of their thickness, and is produced for these purposes at Harwell. It is a very high-powered source of radiation, its rays penetrating steel to a depth of 4 in. The apparatus made to control these radiations in the deep therapy unit weighed 3½ tons and was made by the Federal Government's Eldorado Mining and Refining Co.

Scientific & Industrial Research

International Discussions Concluded

VALUE of personal contacts and the opportunity to share knowledge and exchange views was well demonstrated by the International Symposium on the Organisation of Scientific and Industrial Research which was held at Lancaster House, London, and was concluded on Thursday, 15 November. Delegates from 11 OEEC countries, besides Great Britain, attended, as well as representatives from the U.S.A. and observers from Canada and other parts of the Commonwealth.

'Sponsored Research' was the subject of papers and discussion at the third session. Some interesting comparisons between research institutes in Great Britain and America were made by E. S. Mactaggert, of the Sondes Place Research Institute, who began by saying that the term 'Sponsored Research' in the sense in which it is commonly used in the English-speaking countries today is somewhat inaccurate, since in this age of professional scientists, practically all the research done in the world is sponsored, that is, paid for by some individual, firm or public body.

Although 'Research by Contract' would be, perhaps, more descriptive, the term is generally understood and accepted to mean research of a scientific or technical nature, carried out in an independent laboratory, the results of the investigation usually being the sole property of the person or body who has paid for it—that is the 'sponsor.'

In Great Britain, although a great deal of post-graduate and post-doctorate university work is paid for by industrial firms, associations and public trusts, the majority of professors accept monetary grants for their students and assistants only on an understanding that the final and detailed choice of subject for research shall be theirs, and not that of the sponsors.

This policy is not nearly so strictly adhered to in the U.S.A. where many universities have large and flourishing departments in which sponsored research dealing with industrial problems is accepted. How far this is responsible for the general opinion that Europe leads the U.S.A. in matters of fundamental science is open to question.

With the widening scientific development it became clear that the chemical consultant

Some of the delegates from 11 countries at Lancaster House

Professor Kruyt (Netherlands)

(however brilliant he might be) must be replaced by an organisation or team to tackle the solution of major industrial scientific problems. Team work between chemists, metallurgists, physicists and so on, is, of course, often found in a large industrial laboratory, and there are many points in common between such laboratories and an industrial research institute.

Many of the endowed research institutes in America have the avowed aim of carrying out work of an academic nature, so long as the results may be applied for the good of mankind. Most of the projects, however, have a more commercial flavour and many are started with no other end in view than to overcome some difficulty which has been experienced in a production process or a deficiency in a product.

Only two research institutes exist today in Great Britain, namely, Fulmer and Sondes Place. The former has a strong bias towards metallurgy, especially non-ferrous, while the latter tends more towards chemistry and chemical and mechanical engineering.

Both were started about four years ago, but whereas Sondes Place is the expansion of a consulting practice, formerly carried on in London, Fulmer started 'from scratch,' albeit with the guarantee of a substantial amount of work from one of the companies interested in its formation. The growth of each institute has been steady, if not spectacular, Fulmer now having a staff of about 80, while Sondes Place employs some 40 people including 10-12 qualified chemists, two chemical engineers, one mechanical engineer assisted by three draughtsmen, a workshop staff of seven, an economist who also looks after the library and information services, and about 15 unqualified assistants.

Most independent research institutes have started life in buildings originally erected for other purposes and the layout has had to follow the general lines of the existing plans. In handling a great variety of problems it is a great advantage to have a number of small laboratories housing two or three assistants rather than one large laboratory. Pilot plant facilities, which are essential in any research institute carrying out sponsored research, require a large amount of space and plenty of head-room. One large laboratory is to be preferred, with services running all round the walls with frequent take-off points.

Equipment presents several problems which do not ordinarily arise in an industrial research laboratory where the work follows well-defined lines and where it is not difficult either to select the most suitable items of general equipment or to decide whether the purchase of a special instrument can be justified.

A research institute may be called upon to tackle a much wider range of problems, many of which cannot be foreseen, and the final choice of equipment may be dictated by versatility rather than by suitability for a specific job. This usually means a higher capital outlay but the increased expenditure on any individual item may easily lead to a large net saving in the long run, if it enables an instrument to be purchased which is adaptable to a variety of jobs.

Integration of Equipment

An equally important factor is the integration of equipment, by which we mean choosing instruments in such a way that collectively they can be used in the solution of problems to which each individual unit could make only limited contributions.

Selection and composition of staff presents similar problems, namely, keeping a proper balance between specialisation and versatility.

What the future of 'Sponsored Research' is likely to be in England it is difficult to say. It is certainly clear that it will not be in any way comparable to that of the U.S.A., even when due allowance has been made for the difference in industrial capacity of the two countries. There are probably two reasons for this, namely, the influence of the research associations in Great Britain which inevitably do a large proportion of the work done in research institutes in the U.S.A., and secondly the fact that with few exceptions, the American institutes are all 'charitable organisations,' that is to say so-called non-profit making bodies. 'So-called' is used deliberately because, in fact, they all do make substantial profits, but these being tax free are ploughed back into the organisations in the form of new equipment and buildings or used for doing general research.

In this way a somewhat artificial growth of knowledge and facilities is produced, so that such bodies often have a great deal of information, patents, and so on, which, not having been paid for by an individual sponsor, can be released to industry as a whole against payment of royalties. This snowball effect obviously plays a considerable part in their growth.

French Organisation

Structure and functioning of a professional organism for technical research in France was described in a paper delivered at the fourth session of the symposium by M. René Navarre, directeur général de l'Institut Français du Petrole.

Despite their attachment to the service of industries of widely differing character (he said), the centres and institutes of research have a common aim—to help industry keep pace with progress, and to promote and encourage the application of scientific knowledge to industrial purposes.

Resources of the institutes come for the most part from obligatory contributions by industry, though they are sometimes voluntary. State intervention takes the form of nominating the director general appointed to control the establishment and the exercise of certain discretionery powers over finance and seeing that the required results are obtained.

Well-trained staff can play an important rôle in industrial research and one of the main functions is to supply personnel who possess not only general knowledge of a particular industry but are also aware of the most recently developed techniques, while to further aid industry training can be continued by the system of 'exchange' visits of technicians to other countries.

Another vital objective is to keep industry acquainted with new apparatus and methods and to ensure the training of personnel able to make use of them when approved by industry as practicable.

Research by an institute may only be carried out within the limits of its satisfactory conclusion and realisation of the cost which can be appropriated to it. Work should be carried through to the pilot plant stage, and the presentation of new methods and developments to industry. Arrangements must be made for patent rights to cover any such results of investigation.

Institutes are expected to bear in mind that their task is not only to deal with problems which may be sent to them for solution, but also to submit to industry suggestions for improvement of techniques or productivity.

The costing and evaluation of research was the subject of a paper by Sir Wallace Akers, director of I.C.I., Ltd. He said that the paper was not intended so much to give the information as to acquire it as the result of what he hoped would be an active discussion on certain points contained in the paper. Examples given in the paper were necessarily drawn from the chemical industry as that was the only industry about which he was in the least degree competent

Dr. A. King (Great Britain)

to speak. But it was reasonable to assume that the same questions arose in greater or less degree in all other industries in which research was carried on.

The question of the possibility of finding some yardstick by which to measure the amount of money which a company should spend annually on research and development, said Sir Wallace, must be of interest to every director of research.

Many companies did not distinguish between research and development, and he, therefore, proposed to use the word research to cover both fields. In other words, the expenditure considered was that involved in actual laboratory research together with the amount required to bring a project up to the point where the necessary scientific, technical and commercial data had been assembled to enable the company to make a decision to go ahead with the project on a large scale.

Cost per Man

Sir Wallace said that the amount of money a company spent in this way would be related to the number of qualified persons engaged in research, qualified being taken to mean those holding university degrees or other equivalent qualifications. Giving the example of his own company, he said that there were 6,200 people working for I.C.I. research and developments departments of whom 1,700 were qualified research workers, so although during 1950 £3,100 was spent per man on research it must be noted that that figure was an average as the cost per man ranged from £2,200 to £5,400.

It was often found that the research expenditure was expressed as a percentage of the annual turnover of the company and it was an interesting fact that in the chemical industry large firms seemed to spend 3 per cent of their turnover on research each year.

It would seem, he continued, that the top limit of legitimate expenditure would be that sum which, on the average, produced as many successful inventions as the company was in a position to exploit. If research was done on a larger scale than this the result would be that successful research work was merely consigned to the files and not exploited—and this would inevitably affect seriously the morale of the workers in the research department.

Evaluating the results of research was the next question to be considered as clearly research expenditure had to be met from the profits of the company. This was not a question of defending the case for research but even the research director must be interested in the financial results of the work carried out in his department over a long period of years. Even if an accurate method for assessing the profits resulting from research could be found, it would be wrong to assume that this was the sole justification for research and that the latter ought to be reduced if the estimated profits seemed to be less than the total expenditure.

In the first place a company which did no research would almost certainly fall so far behind in its industry that it would eventually go bankrupt. Secondly, unless research of high quality was being carried out in a company, that company would find it very difficult, or impossible, to recruit its fair share of the best brains leaving the universities. The effect of this would be felt not only in the research department but also in production departments as the standard of production manager it was possible to engage would begin to drop. It was for this reason that the more enlightened companies devoted a certain proportion of their research effort to research which approximated much more to pure or fundamental research than to applied research.

No method had been found for assessing the value of research results but one method which Sir Wallace had tentatively put forward was to assume that it was due to the work of the research department that a company was able to invest the money, which was ploughed back into the company, or which it raised expressly for the purpose, at a rate of return higher than that which would be obtained if the money were merely invested in first-class securities.

Estimating Benefit

If, for example, a return of 15 per cent was shown on the capital invested in the plant, by the operation of a new process devised by the research department then it might be reasonable to say that 5 per cent of this was required to 'service' the capital and the remaining 10 per cent might be regarded as the benefit which the company had obtained by reason of its possessing a research department.

This ignored, however, the effort put into the establishment of the new product by the engineering and commercial departments; but these departments would have had no

work to do on this particular project were it not for the original work by the research department.

The whole problem of evaluation of research must have come to the notice of many members of the symposium, concluded Sir Wallace, and it would be extremely interesting to learn what had been the result of their consideration of it.

At the fifth session of the Symposium on 15 November, Dr. Alexander King presented a paper on the application of science in the small firm. This was an attempt to discover the causes of all the impediments that stood in the way of the application of research in the unprogressive firm (usually small, but not always), and to overcome them. Scientists, he said, had important parts to play outside the laboratory. Research in some cases was not being taken up by industry, and unless scientists did their utmost to put an end to this, they would find in time that it would be taken out of their hands by the bureaucrats.

Recently much comparison had been made between this country's productivity and that of the U.S.A. American output was generally recognised to be twice or three times that per man-year in Europe, although the industries concerned were often equally efficient.

Factors governing productivity were many and complex; economic and fiscal factors might appear most significant over a few years, but in the end it was technological education that governed the speed of application of research and hence productivity. Before the war this process was slow, in nearly all industries, but the need for weapons and war quickened all but the more traditional industries. It had not quickened in Europe as much as it had in America, however, so one of the primary tasks of science now was to speed up the rate of technical innovation.

Own Research

In big industries based on modern techniques a high proportion of the firms were large enough to support research programmes by themselves, and the rate of development in these was comparable with their counterparts in America, but in industries founded at the beginning of the industrial revolution and generally containing a high proportion of small firms development had been slow.

***Prof. Edy Velander* (*Sweden*)**

What was needed in Europe now was a wider technological education. Science in the board room was at the moment preferable to science in the laboratory, and the supreme necessity was for understanding people with some knowledge of science to see that the full possibilities of science were applied.

In America, the reverse was true. Many authorities there were calling for a readjustment in the ratio of pure to applied science in that country, seeing that before the war there were an estimated 250 applied research workers to every 100 pure research scientist.

In other countries this ratio was a matter for consideration of the countries concerned. It must vary with each nation. Although there was delay in the dissemination of knowledge, full working details of most technical processes became widely known within a decade, and many scientific improvements to processes were not by their nature patentable monopolies and so were available to any country. However this mass of available technical knowledge had not been digested by many of the under-developed areas of European industry, chiefly through lack of appreciation of the problems concerned and lack of sufficient

technical background to effect the improvements, small firms forming most of the substance of these under-developed areas.

Spreading Knowledge

Getting these technical improvements through to the many small firms was a test of the effectiveness of a country's ability to disseminate technology widely. In the last two decades Governments, rightly, as it affected national prosperity, had taken a very active part in applied research. In many cases such as agriculture and the building industry the basic 'unit' was a small one and quite unable to pay for research itself or select and apply research done by an institute. Government had in these cases applied the research itself and operated agricultural extension services to disseminate it. This in addition to encouraging research in universities and conducting research on defence. Sometimes industries ran information services and employed engineers attached to the main industrial centres to help managers with their problems. The most interesting example of this type of field service was in Canada.

In the U.K. many Research Associations operated similar liaison services. These, however, were confined to individual industries and covered only a few of the firms of the country. A really wide service covering all industry, in a highly industrial country like the U.K. would be impossible because of the very heavy drain on scientific manpower. An alternative developed by most countries which was wider if more remote from the factory, was the technical information service. This varied with different countries and different industries. In some it was merely a library service organised centrally and working to a large extent by the preparation of bibliographies and selected summaries of current literature. In other cases specialist information services aimed at transmitting the results of scientific research and industrial techniques obtained either from printed matter or from the experience of individuals. In the United Kingdom a net-work of such services had grown up, which consisted of technical information groups attached to most of the Government research stations and research associations, together with certain other bodies. In all, some sixty specialised information services existed for particular branches of industry, which answered a wide variety of questions now approaching some 200,000 per annum.

It was agreed policy in the United Kingdom that the industrial service should be operated in a decentralised manner by specialised information officers, attached to live centres of research and development, rather than by the creation of a central information office, remote from both scientific research and industrial activity. Nevertheless, within the Department of Scientific and Industrial Research, there was a strong information section which acted in many ways as a centre of the whole net-work and attempted to direct inquiries directly to sources of special information. It was also responsible for answering questions for which no obvious special information group existed, for carrying out research into the flow and utilisation of information and for international communication in this field. This group co-operated with the other OEEC countries in a scheme recently agreed by the Scientific and Technical Committee.

Qualities Required

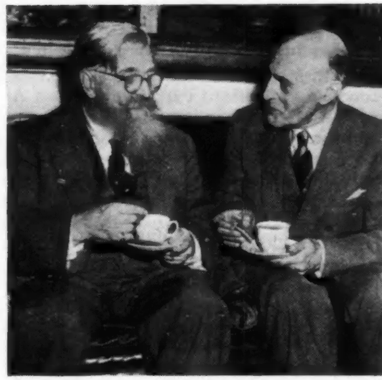
The efficiency of the technical information service was largely conditioned by the quality of the scientists who operated it. Too often in the past these jobs had been considered inferior and suitable for scientific officers who had proved a failure in the research laboratory or insufficiently qualified to join a research team. This was a great mistake. The qualities required of a good information officer were high: not only did he need scientific or technical qualifications which if less deep than his research colleagues must be wider and just as sound, but he must be gifted with an exceptionally good personality, wide judgment and common sense, and with an appreciation of the nature of industrial needs and know-how—by a combination of assets almost as rare as those which made the research leader. In the past it had frequently been regarded as waste to put a good man on information work. Now that it was becoming recognised that much research was of little use unless rapidly applied in industry, pedestrian information services were intolerably wasteful.

These information services were, however, only of use to the more progressive firms, and the problem of the small firms where there was no will or no knowledge to improve remained. In Great Britain this was receiving much attention, and operational surveys being conducted on the flow of

information through industry, its points of origin, methods of assimilation and speed of application would indicate in a few years where real improvements could be instituted in the small firm and how they could be introduced.

In the discussion which followed, Professor Dresden (The Netherlands), emphasised that small firms were not always the unprogressive ones, and said that the reason why they could not be allowed to die the natural death they were probably heading for, was that in doing so they would bring down quality, raise prices and lower the standard of life of the country concerned. In the Netherlands, he said, the Government helped all unprogressive firms, but this was impossible in a large country. A mixed system of payment for research was necessary, part being financed by interested parties and part—for those unable to pay—by the State.

In France, as explained by Mr. de Lombares, a centre of information existed near Paris but it did not reach the mass of small industries in the country, and he did not know how these could be reached by such a means in a large country. Mr. Perucca (Italy), endorsed this by saying that small Italian firms were as hard to get at as the peasants. An American delegate said that private industry was the best manager of research, for three reasons. Firstly, research was never undertaken unless there was a good chance of results. Secondly, there was frequent evaluation of progress, and thirdly, personnel were often changed around from pilot plant to production to sales and vice versa. An U.K. delegate spoke of British efforts to overcome the inertia of small firms with the National Research and Development Corporation. They had over 1,000 different research inventions on their hands, he said, which they circulated to interested firms.



Professor G. Colonnette and Dr. A. Ferrari (Italy)

After a very able summing up by Professor Kruyt (Netherlands), who thanked the DSIR and Britain for their hospitality, the symposium adjourned.

Chilean Nitrate Prices

SUPPLIES of Chilean nitrate of soda imported by the Government both for industrial and agricultural purposes to the 30 November, have been sold.

As the Government (the Ministry of Materials) is no longer responsible, the Nitrate Corporation of Chile, Ltd., has made arrangements for the flow of supplies to continue throughout the season.

On the industrial list, from 15 November, 1951, until further notice, subject to safe arrival of shipments, Chilean nitrate of soda, crystal and granulated 97/98 per cent will be sold in lots of six tons or more, delivered carriage paid to any railway station in Great Britain, at £30 10s. per ton of 2,240 lb. gross weight.

Smaller lots, delivered carriage paid, will be sold at these prices plus the usual surcharges. Terms of payment are cash in 30 days from the date of delivery. The customary allowance will also be made to buyers who collect from port warehouses.

Agricultural supplies are expected to be less than last season. Therefore, until further notice and subject to safe arrival of shipments, Chilean nitrate of soda, crystal 15¾ per cent N and granulated 16 per cent N will be sold in lots of six tons or more, delivered carriage paid to any railway station in Great Britain or c.i.f. main ports in the Isle of Man, at £30 10s. per ton of 2,240 lb. gross weight. The same additional surcharges apply for smaller lots, as in the industrial list. For lots of 2 cwt. or more collected from nitrate depots the price will be £30 per ton, and no surcharges.

New Distillation Unit

Further Justification of Original Policy

IN 1936 Manchester Oil Refinery Ltd. was founded at Trafford Park, Manchester. At that time the contention of the major oil companies was that refining should—for economic and strategic reasons—be carried out in the centres of crude oil production; this was also Governmental policy.

Management Convinced

However, the management of this new, independent company was convinced that advances in refining technique had made it possible to operate refineries economically 'on the doorsteps' of Britain's great consuming industries. Such refineries would have great flexibility, both in the use of their charge stock and in the output of their products. In this way oil users would obtain the specialised products they needed, and the oil refiner would be able to keep in step with technical developments.

The plant of Manchester Oil Refinery was brought into production in 1938. When war started, and Britain was cut off from its main sources of supply of lubricating oils, transformer oils, technical white oils and other oil products, the value of a home based refinery immediately became evident.

Last March, the Chairman of Manchester Oil Refinery Ltd., Mr. H. Stuart Ebben, announced that the throughput of the refinery, which in 1950/51 had reached a figure of 115,000 tons p.a. (compared with the war-time figure of approximately 70,000 tons fixed by the now defunct Petroleum Board), would be increased to 150,000 tons per annum. Details of the first step in this programme are now available; they reveal that construction work is already going ahead on a new 3,500 bbl/day atmospheric distillation unit.

The new unit, which will work in conjunction with the existing vacuum distillation unit, will consist mainly of a fractionating tower approximately 120 ft. high. This tower has the effect of separating, within fine limits, various 'fractions' present in the crude oil. It will extend the existing range of M.O.R. products by producing white spirit and other petroleum solvents as well as petrol. An important consideration is that it will enable the refinery to use crude oil from the Middle East as well as from present sources in the Americas.

Palestine Potash Future

Nationalisation Abandoned

PLANS for the nationalisation of the Palestine Potash Company's Dead Sea works, it is reported, have been all but abandoned by the Government of Israel, which is now expected to enter into a partnership arrangement with the company. Final details of the partnership are being worked out by the Israel Ministry of Finance and will be exhaustively studied by the Cabinet. The issue has already been placed on the Cabinet agenda, but it is uncertain when it will come up for discussion.

The knotty problem of resuming operations at the Dead Sea plant has been the subject of long drawn out negotiations between the Government and the company. The firm was allocated $2,500,000 from the U.S. Export-Import Bank loan to Israel, with the stipulation that it raise an additional two million sterling, but the company's efforts proved unsuccessful.

Lord Glenconner, chairman of the company, arrived in Israel for a short visit some weeks ago and, together with Mr. M. Novomeysky, the managing director, conferred with Government officials on the problem. They submitted a memorandum at the time outlining the situation, including the financial details. No decision was taken because of the Cabinet crisis at the time, although the memorandum was under study.

Officials Disagreed

Some official quarters favoured the complete nationalisation of the industry, noting that the company had failed to live up to the financial agreement, and that with its limited funds it could not properly exploit the area at the southern end of the Dead Sea. Other Government agencies emphasised the repercussions that might result in foreign quarters. Arguments were also put forward that the physical task of reopening the plant was so formidable that it might best be tackled by experienced company hands. But the decision to discard the nationalisation plan came only after the British elections.

The plant, which is situated at the southern end of the Dead Sea at Sodom, ceased operations at the beginning of hostilities between the new state of Israel and the neighbouring Arab countries in 1948.

Brazilian Chemical Industry's Progress

Increasing Production of Alkalis

THE President of the Brazilian Republic has approved the plans of the Companhia Nacional de Alcalis to build a factory at Cabo Frio, State of Rio de Janeiro, to produce 100,000 tons of barilla, 20,000 tons of caustic soda, 22,000 tons of plaster of Paris and other derivatives annually. Brazilian coal, of which it is hoped to increase and cheapen production, will be used as fuel.

During the first six months of 1951 Brazil imported 36,618 tons of caustic soda and 27,195 tons of barilla at a cost of £3,593,000. Consumption is increasing by approximately 100 per cent every ten years, and in view of the growing needs of local industries the recently appointed Commission for Industrial Development has been instructed to examine the proposals of other national and foreign enterprises to manufacture similar products in Brazil. Among these proposals is one by a well-known foreign group to build a factory on the San Francisco River and manufacture 36,000 tons of caustic soda and 30,000 tons of chloric products annually by electrolytic processes. The factory would take current at low rates from the government's powerful hydro-electric station, now under construction, at the Paulo Afonso Falls. The necessary raw materials are available in the district, and S. Paulo textile manufacturers plan to build mills in the neighbourhood, in close proximity to the North-eastern cotton plantations. These mills are expected to absorb part of the factory's output.

Approved by Commission

Both the above projects have been approved by the Brazilian-United States Technical Commission, which is studying plans for Brazil's industrial development. During his recent visit to Washington the Brazilian Finance Minister obtained the agreement of the World Bank and the Export-Import Bank to the principle of financing certain basic manufactures, such as barilla, caustic soda, fertilisers and sulphur. The general lines of the agreement are that Brazil shall raise the funds to cover the expenditure in cruzeiros, namely labour, buildings and materials obtainable in the country. The international banks will then guarantee to advance an equivalent sum to defray the cost of machinery and equipment to be imported. Local expenditure is to be covered by compulsory contributions to an internal loan from those whose income tax exceeds the equivalent of £100 annually.

Caustic Soda by Solvey Process

Local production of caustic soda is at present almost exclusively by the Solvey process and barely supplies one-fifth of consumers' needs. By combining chemical and electrolytic processes production can be boosted to meet the requirements of national industries. Barilla is not yet produced in Brazil, but chloric products have been obtained electrolytically in small quantities at a factory in the State of Rio since 1936. In 1948 and 1950 two other factories were inaugurated in S. Paulo to produce chlorine, chloric acid, chlorates, solvents and caustic soda. Quite recently a factory was inaugurated in the Federal District, in which soda is combined with sulphur to produce sodium sulphate by a new process, and chlorine is transformed into chloric acid and hypochlorides. Several textile mills, soap and disinfectant factories produce sodium chloride electrolytically for their own needs.

A simple, self-contained machine has lately been introduced into Brazil to convert common salt into caustic soda and chlorine in the limited quantities required by small industries. The unit consists of a highly developed mercury cell with denuder, power rectifier and brine equipment. It is guaranteed to produce 225 lb. of high quality caustic soda and 200 lb. of chlorine in 24 hours.

The rate of expansion of the Brazilian chemical industry shows no sign of slowing down. Four manufacturers, controlled from abroad, raised their capital by the equivalent of £1,340,000 in September last, and the following further developments are planned or have been put into execution: Companhia Nitro-Quimica Brasileira, in association with Italian industrialists, is to instal a chain of eight factories to produce heavy chemicals, caustic soda, fertilisers and synthetic ammonia. The same organisation

co-operating with French interests, will build three others to make synthetic and organic yarns of the 'nylon' type. Duperial S.A. has approached Brazilian industrialists with a suggestion to instal apparatus for processing their nylon yarn in Brazil. This has hitherto been imported in small quantities, already prepared for use in the manufacture of stockings and socks. The Italian Ambassador recently told the Press that an Italian firm will shortly be established in Brazil to build machinery for the industrialisation of rayon yarn and caustic soda. Reichhold Chemicals Inc., of Detroit, has opened a subsidiary in S. Paulo and signed a contract with Resana S.A. to make synthetic resins in Brazil. Morganti, of S. Paulo, has acquired plant in Great Britain to manufacture cellulose and paper from the begasse of sugar cane by the 'Celdecor' process, and a factory in the State of Rio is producing butanol and acetone from molasses. Alba S.A., founded in 1947 in Curityba to manufacture casein glues for the plywood industry, now makes urea, phenol and resorcinol formaldehyde resin glues and is extending its range to include paraformaldehyde, hexamethylenetramine and pentarythritol.

Importance Growing

The last-named products, not hitherto made in Brazil, are vital ingredients in the manufacture of insecticides which, together with the preparation of fertilisers, is assuming an important place in the list of Brazil's chemical activities. The Bahia State Government is granting subsidies, at the rate of £12,000 annually, to any factory installed in rural districts to manufacture specified insecticides or nitrate, phosphatic and potassic fertilisers.

Plant has recently been installed at Ipanema, S. Paulo, to prepare superphosphates on a large scale. The important apatite deposits of Jacupiranga, S. Paulo, of Araxa, Minas Geraes, and those in two North-eastern States are now being exploited commercially. An electric furnace has been set up at Araxa and two factories are being built tc prepare phosphates. Organic phosphate and calcium phosphate occur in four Brazilian States. Three companes were founded in 1949 to produce phosphates, superphosphates and potash. A Brazilian firm, assisted financially and technically by Swiss industrialists, is building a factory in Bahia to produce 45,000 tons of nitrogen annually, using natural gas from the government wells in that State. Société Tunisienne de l'Hyperphosphate Reno has formed a Brazilian subsidiary and will open a chain of factories to prepare hyperphosphates, importing the raw material from its African deposits until local supplies are available in sufficient quantity. Three Brazilian groups, one aided by French capital, are preparing to engage in similar activities. A company is being formed, with mixed state and private capital, to produce synthetic ammonia from the gases of the government oil refinery, now under construction at Cubatao, S. Paulo. The necessary equipment will be supplied by French manufacturers. Etablissements Kuhlmann is to supply equipment to a Brazilian enterprise, in exchange for shares in the company, for the treatment of superphosphates. Finally, a chain of small Central Mills to crush soil containing phosphate, potassium and calcium is being built by the government in Minas Geraes.

In spite of expanding local production Brazil's imports continue to increase in order to meet the growing needs of agriculture and industry. During the first half of 1951 Brazil imported 254,542 tons of chemical products, as compared with 214,312 tons in the corresponding period of 1950 and 270,719 tons during the whole of 1949. Imports of chemical fertiliser have increased from 119,611 to 142,809 tons, and imports of insecticides from 3,212 to 3,525 tons.

During the twelve months of the Anglo-Brazilian Trade Agreement, which expired on June 30 and is not being renewed at present, Brazil imported the following from the United Kingdom: Synthetic resins or plastic materials, £649,050; solvents and plasticisers, £330,216; soda ash, £583,385; copper sulphate, 129,515; caustic soda, £1,296,472; unspecified inorganic chemicals, £1,855,120; insecticides and similar preparation, £92,384.

To Extend Plant

A soda-ash plant set up in Colombia by the Instituto de Fomento Industrial in collaboration with the Banco de la Republica, which will shortly be completed, is designed to produce 52,000 tons of soda yearly. This amount is now considered insufficient for needs and plans are being made to extend the plant in order to produce another 36,500 tons a year.

New Fat-Splitting Plants

Bamag Supply Belgium

A NEW continuous fat-splitting process incorporating to a high degree the economies made possible by the continuous process is now being offered in a range of plants made by Bamag, Ltd., of London. The fat-splitting process is of special interest to the soap manufacturer, and is being increasingly adopted by the modern soap industry to replace the age-old method of saponifying oils and fats in the soap kettle, by boiling with caustic soda solution until soap and glycerine are obtained. By this method the glycerine has to be recovered by repeated 'brine washes', and the resultant large quantities of a dilute solution of glycerine in brine known as 'soap lyes' make it a very lengthy and heat-consuming operation. In the fat-splitting process, the glycerine water is obtained directly from the fat-splitting plant and does not enter the soap pan. It is also free from salt, and can be concentrated and refined separately. The fatty acids split off can then be used for soap-making, using soda ash to neutralise them.

The continuous fat-splitting process facilitates subsequent distillation of the fatty acids after they are produced—greatly enhancing the possibilities of continuous soap-making processes, and even in the conventional soap pan greatly simplifying the fitting operation, giving a yield of practically 100 per cent of neat soap, with attendant economies in steam and handling charges. High quality final products are assured even from low-grade materials, and the high concentration of the glycerine water resulting from the fat-splitting gives a most economical prospect for recovery.

Catalyst not Employed

The Bamag plants do not employ a catalyst but simply rely on the action of water at high temperature and pressure. Their range varies from batch medium pressure plant to the newest high pressure continuous plant, and, they say, due to the reduced operating times the risk of deterioration in the quality of the fatty acids is negligible.

On arrival at the factory the fat is submitted to a de-gumming process, acid treatment or other suitable purification process, to remove extraneous matter which might have an adverse effect on the hydrolysis or on the quality of the split product. It is then de-aerated together with the water which is added to it, to prevent discolouration of the product due to oxidation, and the water is added. The preheated mixture is run into the reactor, where the water and oil are kept thoroughly mixed, and after reaction they are cooled and separated continuously.

The separated water passes through a cooler concentrator, from which it issues with a high concentration of glycerine (over 50 per cent). If desired the glycerine-water can be further concentrated without further input of heat. The split fatty acids of a high degree of purity issue continuously from the plant.

This continuous process may be carried out in one or two stages. The one-stage process splits 96 per cent of the fat and allows economy in the initial cost of the plant, while the two-stage process splits the fat twice, achieving a 98-99 per cent split. These plants are manufactured in sizes ranging from 12-100 tons per 24 hours. Conditions of flow can be varied, and automatic control is said to ensure a minimum of supervision.

Polymerisation Plant

THE Monsanto Chemical Company, St. Louis, U.S.A., have announced that integrated facilities for the production of polyvinyl chloride resins and compounds of the Ultron 300 type manufactured by Monsanto in the United States are under construction at Porto Marghera, Italy, by Societa Industria Chimica, an Italian company in which Monsanto holds an interest.

A chlorine-caustic plant employing De Nora mercury cells has already been put into operation. Acetylene for producing vinyl chloride monomer will be made from calcium carbide from a nearby plant in which Societa Edison, major power company of Italy, has an interest. Societa Industria Chimica is a subsidiary of Edison.

The polymerisation plant, also being built at Porto Marghera, will be the largest of its kind in Italy.

Monsanto entered the vinyl chloride market in the United States in March, 1947, following three years of pilot plant production. Since that time the company has been making the product at its Plastics Division plant at Springfield, Massachusetts, under the trade name 'Ultron'.

IN THE EDITOR'S POST

'Silica and Silicates'

SIR,—I have just read the article entitled 'The Analytical Chemistry of Silicon' which was an account of the procedings of a meeting of the Midland Analytical Methods Discussion Group. The article is so informative and useful that it seems a little ungracious to offer any criticisms but I think there are one or two points which call for comment.

The article would have been much better entitled 'The Analytical Chemistry of Silica and Silicates' since the vast majority of the work mentioned concerns these chemicals. This is, I think, borne out quite clearly by the opening paragraphs in which it is suggested that the material can be fused with sodium carbonate in a platinum crucible. Once having tried, many years ago, to fuse silicon itself under such conditions with disastrous results to the platinum crucible, I think a word of warning is not out of place. Silicon cannot be opened in this manner in a platinum crucible although silicates are opened out daily by this method.

In the last paragraph there is a reference to the determination of silicon and silica in the presence of each other by differential volatilisation with hydrofluoric acid. Here again it might be well to point out that this is not very accurate. During the volatilisation of the silica with HF and subsequent ignition, some of the finely divided silicon nearly always converts to silica.

In connection with this last paragraph, it should also, I think, be pointed out that in silicon 'metal' as such the analysis is complicated by the presence not only of Si, SiO_2 and SiO_3 but also by the presence of silicon carbides and nitrides and metallic silicilides. The proper analysis of silicon metal is a real problem, an answer to which I have never seen so far in print. It may well be, of course, that all these points were covered in the subsequent discussion. Is it too much to hope that we may perhaps be permitted to see this discussion in print.

Finally, another small point—I should very much like to have seen a list of references since many authors and methods are referred to, and without these references the article loses some of its value to the practicing analyst.—Yours faithfully,

Chief Analyst G. H. OSBORN,
(B.D.H. Laboratory Chemicals Group).

Nobel Prize Awards

Recognition of Nuclear Physics

AWARDS of this year's Nobel Prizes for chemistry and physics were announced last week and were shared between two American and two British scientists, all of whom are distinguished for their work in connection with nuclear physics.

The prize for chemistry is divided between Professor G. T. Seaborg and Professor E. M. McMillan, both of the University of California, for their discoveries of the transuranium elements.

Professor Seaborg, who took his Ph.D. at California University, has been professor of chemistry there since 1945. From 1942-46 he was loaned to the metallurgical laboratory, University of Chicago and in 1947 he was Nieuwland lecturer at Notre Dames University. Noted as a research worker in nuclear chemistry and physics and artificial radioactivity, he was co-discoverer in 1940 of element 94 (plutonium) and a year later of the nuclear energy source isotope Pu 239, and in 1944 of two further elements 95 (americium) and 96 (curium).

Since 1946 Professor Seaborg has been a member of the general advisory committee of the Atomic Energy Commission and a member of the Commission on Radioactive Constants of the International Union of Chemistry. He has been a councillor-at-large of the American Chemical Society since 1947.

Professor E. M. McMillan, after taking his Ph.D. at Princeton University, became a national research fellow at the University of Calfornia in 1932, where he has been professor of physics since 1946. From 1940-1945 he was engaged in war research.

In recognition of their work on the atom, the physics prize is divided between Sir John Cockcroft, who has been director of the Atomic Energy Research Establishment, Harwell, since 1946 and Professor E. T. S. Walton, of Dublin University.

Sir John, who was educated at the University of Manchester and St. John's College, Cambridge, was, for three years from 1941, chief superintendent of the Air Defence Research and Development Establishment.

Professor Walton received the Senior Research Award of the DSIR 1930-34. Since 1946 he has been Erasmus Smith's professor of natural and experimental philosophy at Trinity College, Dublin.

PERSONAL

Additions to the membership of the Gas Council's Research Committee have recently been announced. They are as follows: MR. J. H. DYDE, president of the Institution of Gas Engineers, in succession to MR. F. M. BIRKS; MR. G. LE B. DIAMOND, C.B.E., Professor of Chemical Engineering, University of Birmingham; DR. F. J. DENT, Director of Research at the Council's Birmingham Station. MR. F. M. BIRKS, C.B.E., deputy chairman of the North Thames Gas Board, will continue to serve on the committee. These additions follow invitations from the Gas Council to each Area Board which administers a research station to nominate its chairman or deputy chairman as a member of the committee.

MR. L. DAVID, a director of British Unicorn Ltd., left London Airport by B.O.A.C. Argonaut on 13 November on the first stage of a seven-week business visit to Brazil. His visit is in connection with the export of certain industrial raw materials, such as those used in meteorology and the chemical industry, to Brazilian markets. His intention is also to meet his company's agents in each city and to see some of its more important customers.

The Royal Dutch Petroleum Company has announced that MR. B. TH. W. VAN HASSELT has decided for reasons of health to resign from the position of director-general, to take effect at the end of the year. For the same reason he has tendered his resignation at a managing director of the operating companies of the Royal Dutch/Shell Group, to take effect simultaneously.

In view of the foregoing, MR. L. SCHEPERS has been appointed a managing director of The Anglo-Saxon Petroleum Company, Ltd., of The Shell Petroleum Company, Ltd. and of N.V. de Bataafsche Petroleum Maatschappij, such appointments to take effect on 1 January, 1952.

Mr. Schepers is at present a manager of N.V. de Bataafsche Petroleum Maatschappij and is responsible for the co-ordination of exploration and production activities.

At the next meeting of shareholders of the Royal Dutch Petroleum Company, Mr. B. Th. W. van Hasselt will be proposed as a director and Mr. Schepers as a managing director of that company.

Imperial Chemical Industries, Ltd., announces that MR. J. D. ROSE has been appointed Dyestuffs Division Director in charge of research. Mr. Rose joined the company in 1835 in the Dyestuffs Division, Blackley. After working in the resins section of the research department under Dr. E. E. Walker, the exploratory research section under Mr. C. Paine and the polymer auxiliaries section under Dr. R. Hill, he went to the techno-commercial department in 1942. A year later he became section leader, exploratory research section, and in 1949 he was appointed associate research manager of the general organic chemicals division of the research department.

MR. E. L. PIXTON, manager of Purchases of Monsanto Chemicals Limited, announces the appointment of MR. GILBERT DODD as Deputy Manager of the Purchasing Department. The appointment becomes effective on 1 January, 1952, when Mr. Dodd will transfer his office to the headquarters of the Company's Purchasing Department at Abford House, Wilton Road, London, S.W.1.

Mr. Dodd, at present manager of the Plastic Sales Department, has been with the company for thirteen years. He is well known in the chemical and plastics industries both at home and abroad.

B. N. GHOSH, M.Sc., Ph.D. (Leeds), A.R.I.C., has been appointed lecturer in inorganic and physical chemistry in the Department of Chemical Technology, University of Bombay. His present address is 17 Kohinoor Road, P.O. Dadar, Bombay 14.

MR. W. L. THOMAS, F.R.I.C., F.C.S., Chief Chemist of Woolcombers Ltd., has been elected to Fellowship of the Textile Institute.

Mr. Thomas, an examiner to the City and Guilds of London Institute on woolcombing chemistry and physics, has been responsible for research work in connection with effluent treatment and wool grease recovery.

· HOME ·

Branch Office

Aluminium Wire & Cable Co., Ltd., have announced the opening of a Midlands branch office at Great Western Buildings, 6 Livery Street, Birmingham, 3. Telephone: CEN 5370.

Royal Society Medallists

It has been announced that His Majesty the King has been graciously pleased to approve recommendations made by the Council of the Royal Society for the award of the two Royal Medals for the current year as follows:—

To Sir Howard Florey, F.R.S., for his distinguished contributions to pathology by his studies of the functions of mucin and by his work on penicillin and other antibiotics.

To Sir Ian Heilbron, D.S.O., F.R.S., for his distinguished contributions to organic chemistry notably in the field of vitamin A and polyene synthesis.

Copper and Zinc Restrictions

A new Order (the Copper and Zinc Prohibited Uses (Ministry of Supply) (No. 2) Order, 1951, S.I. 1951 No. 1,960, came into force on Tuesday, 20 November, extending the list of articles in which the use of copper, zinc and their alloys is prohibited. Among the miscellaneous goods affected are: agricultural requisites, electrical and gas equipment and fittings, and air conditioning equipment. The additions take into account the agreement made by OEEC countries in Paris made on 25 September.

Food Improvers

The problem of chemicals as food improvers was again the subject of questions in the House of Commons on 15 November. Mr. Peter Freeman asked the Minister of Health what steps were being taken to implement the recommendations of the report of the Government Advisory Council on Scientific Policy and Dr. Barnett Stross brought up the desirability of creating in Britain an organisation similar to the food and drug administration of the U.S.A. In reply, Captain H. F. Crookshank said that until the problem and the cost involved in manpower and money had been fully investigated, he was not in a position to state what action could be taken.

Drawback Allowance

The Treasury have made the Import Duties (Drawback) (No. 26) Order, 1951, which provides for the allowance of drawback of Customs duty paid on imported linseed oil used in the manufacture of linseed oil fatty acids.

The Order which comes into operation on 19 November, 1951, has been published as Statutory Instruments, 1951, No. 1933.

New Head Office

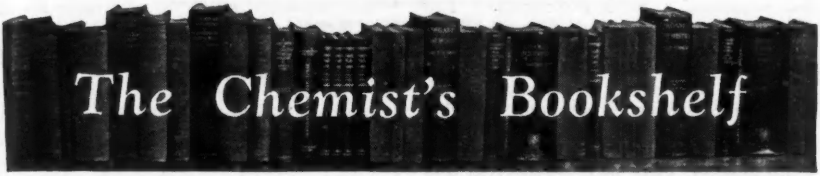
As from 1 December, 1951, the head office address of The British Aluminium Company Limited will be Norfolk House, St. James's Square, London, S.W.1. (Telephone No. Whitehall 7868).

Norfolk House was built in 1938 on the site of the Duke of Norfolk's residence and the company was to have moved there in September, 1939.

At the outbreak of war, however, the building was requisitioned and used later as the Supreme Headquarters of the Allied Expeditionary Force. In the company's board room, General Eisenhower and his staff planned and launched the allied operations for the liberation of North Africa and the Continent of Europe.

Atomic Power for Industry

The need to increase efforts for the application of atomic energy and its products to industrial purposes, was emphasised by Sir John Cockcroft, director of the Atomic Energy Research Establishment, Harwell, when he delivered the Joule Memorial Lecture of the Manchester Literary and Philosophical Society at the Manchester College of Technology on 19 November. The only method of utilising nuclear energy in sight, said Sir John, was to use the atomic pile, or nuclear reactor, as a source of heat to replace the fuel burners of a conventional power station. After briefly surveying various types of reactor, capital costs, and the development of nuclear power for propelling units, Sir John concluded by describing some of the more immediate applications of atomic energy products to industry and science.



PLASTICS PROGRESS. Edited by P. Morgan. Iliffe & Sons, Ltd., London. 1951. Pp. 310. 50s.

This book contains an account of the lectures and discussion which took place at the British Plastics Convention held from 6 to 15 June at the National Hall, Olympia. The papers, in many cases compressed in order to fit a limited time schedule, have been printed in full and the discussion has been edited from tape recordings of the proceedings. The material was edited by P. Morgan, the editor of the journal *British Plastics,* which was responsible for its publication. The text has been illustrated by some 400 photographs and diagrams.

The book contains a great deal of information which will concern the chemist in many diverse occupations and the general review of the position of plastics in industry given by Sir Ben Lockspeiser makes this abundantly clear. The physical chemist will be interested in the lecture by Sir Eric Rideal on the physico chemical background of synthetic fibres in which he considers the correlation between the chemical structure and mechanical properties of synthetic fibres from the standpoint of thermodynamics. The organic chemist will probably confine himself to reading the fascinating account of the discovery and development of Terylene, or Staudinger's review of the effect of cross linking in vinyl polymers. The latter paper contains particularly good explanatory diagrams and the more obscure methods of cross linking involving mercuriation and diazotisation are mentioned.

The greatest value of plastics to the chemical industry itself is in the possibility of constructing corrosion proof apparatus and plant, and this subject is dealt with in a lecture by V. Evans. Tank linings of all types are mentioned from 'Perspex' to polythene and this section is copiously illustrated. A companion lecture is concerned mainly with the uses to chemical engineers of unplasticised polyvinyl chloride. This paper is particularly complete and could be a useful guide for chemical engineers proposing to employ this material in the construction of chemical plant. The mechanical properties of the material are given in several tables and there are many diagrams of the fabricated material. Its wide and general application is illustrated by photographs of ventilation stacks and ejectors, troughs, tanks, pipelines and absorption towers.

In addition to a number of papers which will be of concern only to those directly involved in the plastics industry itself, there are a collection of lectures which deal with the application of plastics to a diversity of fields. Among the industries discussed are the automobile, ship building and aircraft industries, architecture and building and the textile industry. Further and less likely uses were in surgery, printing, film production, while the achievements in such industries as packaging and the electrical trades, in which the use of plastics is well established, were also reviewed.—J.R.M.

ENZYMATISCHE ANALYSE. By Hermann Stetter. Verlag Chemie, GmbH. Weinheim/Bergstr. 1951. Pp. 210. Dm. 1750.

While there are many good books on enzymes and their general uses, information on their application in chemical analysis is not only scanty but widely scattered and Dr. Stetter has attempted to remedy this situation. His book deals with all well known and some newly discovered enzymes such as penicillase and the types of analyses to which they are applicable.

Britain was the first country in the world to apply food analysis for the legal enforcement of purity and other accepted food standards. In consequence, some of the continental methods of food analysis are less stringent than those in use in Britain. For example, the author describes methods of making a malt extract and using this in the analysis of starch, thus introducing maltose in order to determine maltose, with-

out suggesting a blank experiment. This will be rejected without hesitation by any experienced British chemist, but as this book is for readers who have a good knowledge of chemistry not much harm is done. The author says that he has included a chapter on the preparation of various enzymes. This is correct. Unfortunately, these occupy only four and a quarter pages and deal with very few enzymes, some of very doubtful utility. The preparation of α-amylase from spittle may be very interesting but hardly good enough to be included as an analytical process.

There is no description of the preparation of diatase and pepsin although these enzymes have for many years been obtained from fine chemical dealers and no method is described for the standardisation of urease though analysis of this enzyme plays an important part and occupies a large proportion of the book. It is most humiliating to a chemist to have to rely on commercial materials without check on their purity and strength.

The largest proportion of analyses in which enzymes are employed belong to animal and plant physiology and in some cases they are the only methods which are satisfactory. Thus, the digestibility of various proteins can be established without recourse to animal experiments by using pepsin, trypsin, papain and enzymes contained in rennet.

Many of the shortcomings of this book are due not to lack of learning but to scarcity of material. Therefore, the better known enzymes have literally been flooged to death. Taken in all, it is a valuable book but one that will suit only an experienced and critical chemist.—S.P.S.

INTRODUCTION TO THE PATENTING OF INVENTIONS. By Cecil Hollins. Ernest Benn, Ltd., London. 1951. Pp. 100. 4s. 6d.

This book is intended as an introduction to Patent Law for those people whose business necessitates some knowledge of this subject and particularly for the student commencing his training in a patent department. The author has had considerable experience in Chemical Patents having been the head of the I.C.I. patent department.

It is based on the Patents Act 1949 and incorporates marginal reference to the relevant sections of the Act so that both can be read together; this is an admirable system as the Act made few substantial changes in the law but rather had the effect of codifying the existing statute and case law.

The author's references to the reports of cases while encouraging the student to look up the original so that he obtains a sound basis for the study of case law are not so numerous that he will 'fight shy' of them. The author has possibly given too many references in two cases, both of them difficult subjects which are based almost solely on case law—Inventiveness and Employee—Inventors' Patents; it is suggested that it would have been more satisfactory if a reference had been given to one of the more advanced text books such as Terrell or Blanco-White rather than present the student with the problem of attempting to disentangle judicial niceties.

The chapters on the application and the grant of Letters Patent are lucid and comprehensive and should give an adequate grounding in procedure and the rights conferred by the grant. In Chapter 4 the author has grouped the main grounds for a patent being invalidated before or after the grant. This is undoubtedly the most difficult part of Patent Law and the number of cases when a patent has been granted and later revoked by the courts shows that even for experienced Patent Agents this is a far from an easy subject.

The author has only given a brief outline of infringement actions and appeals which are themselves very specialised subjects more in the sphere of the Patent Bar than the Patent Agent. There is a short chapter on some special types of inventions such as food and medicine, and chemical which should be of added interest to those employed in these industries.

The appendices deal with certain topics which relate to foreign patent laws, for example in certain countries it is necessary that the inventor works his invention within a certain time otherwise the grant lapses which in certain other countries it is possible to obtain a patent after publication which is contrary to our law.

The index can also be used as an independent index to the Patents Act 1949. This book should fulfil the purpose which the author intended and can be recommended to all interested in Patent Law. —M.C.H.

OVERSEAS

Memorial Lecture

Plans for the great new Wilton works of Imperial Chemical Industries, Limited, to cost $120,000,000 by the time it is completed half a century hence, were described by Dr. J. W. Armit, Canadian-born official of the company, in a recent speech to the Society of Chemical Industry, Canadian section, at Montreal.

He delivered the third biennial Arthur B. Purvis Memorial Lecture which was founded to commemorate the memory of the late Rt. Hon. Arthur B. Purvis, president of Canadian Industries, Limited, who lost his life in an airplane crash at Prestwick, Scotland, in 1941.

Potash Production

It has been reported from Hanover that West German production of raw potash salts in October was 991,800 tons, compared with an average monthly production of 885,000 tons from January to September this year.

Sicilian Sulphur

Italian sources state that concern is being felt about the low level of Silician reserves of sulphur, which are estimated at 6,000,000 tons. With production running at the yearly level of 1,250,000 tons, the known reserve will only last approximately four years.

U.S. Antimony Prices

From 21 November, the American domestic price for antimony, f.o.b. Laredo, containing at least 99 per cent antimony is raised to 50.00 cents per pound from 42.00 cents previously. Also effective November 21, antimony in cases, ex-warehouse New York, 10,000 lb. or more but less than carload, R.M.M. brand, is raised to 51.85 cents per pound from 43.85 cents.

A.I.Ch.E. Annual Meeting

Atlantic City, N.J., will be host to the American Institute of Chemical Engineers for its annual meeting at the Chalfonte-Haddon Hall, 3-5 December, 1951. Highlights of the technical programme will be symposia on industrial waste disposal and heat transfer, as well as individual papers from such diverse fields as coal gasification and atomic engineering. As an innovation there will also be several papers on opportunities for chemical engineers in sales, the papers to be given by prominent chemical marketing executives.

Copper Agreement

It is reported from New York that the U.S. Defence Materials Procurement Agency has reached an agreement with the Anaconda Copper Company, whereby the company has been assured of a market providing it spends £32,700,000 on expansion.

It is estimated that production will be increased by more than 30,000 tons annually.

According to the agreement, copper that the company cannot sell to domestic consumers will be purchased by the Government at 25½ cents a pound, f.o.b. Mid-West markets.

Construction Started

Consolidated Paper Corporation, Ltd. has started construction at Grand-Mere, Quebec, of a $500,000 plant for production of sulphur from local pyrites.

The corporation is one of the largest newsprint producers in Canada. Its mills also have an annual capacity of nearly 700,000 tons of kraft paper, some 20,000 tons of kraft pulp, 15,000 tons of cardboard, and over 40,000 tons of unbleached sulphite pulp.

May Remit Royalties

An official study is being made in Brazil of the question of remitting royalties payable for patents, trade marks and technical services, with a view to classifying them as essential or non-essential and finding out whether it will be possible to effect any savings in foreign exchange therefrom. These remittances at present cover such items as designs, manufacturing processes, specifications, trained personnel, patent rights and the use of trade marks.

Radioactive Snow

Snow carrying particles of radioactive dust from the atomic explosion in Nevada is said to have been the cause of a photographic paper-coating factory in Rochester, New York, suspending its operations. According to reports, a representative of the Du Pont de Nemours Co., stated that the dust had entered the factory by the ventilating system and much of the stock was ruined by the radiations which had the same effect on the photographic paper as its exposure to light.

Publications & Announcements

IN recent years the electron microscope has found wide application in the study of the fine structure of cellulose fibres. Such investigations have been proceeding for some time at the Institute of Physical Chemistry, Uppsala University. This work has been closely followed by William H. Algar and Hans Wilhelm Giertz who contribute an article (published in English) on 'The Influence of Ultrasonic Treatment on Wood Cellulose Fibres', to the October issue of *Svensk Papperstidning* (The Swedish Paper Journal, Vol. 54, No. 20).

* * *

A TECHNICAL monograph on 'Refrigeration Insulation' has recently been published by *Modern Refrigeration* on behalf of the Institute of Refrigeration. It contains a survey of important subjects in refrigeration such as thermal conductivity; moisture absorption; heat flow; cellular structures; insulated construction; frost-heave; solar radiation; selection of insulant; precautions with concrete; use of asphalt; airlocks; tables; appendix. The author is G. Yate Pitts, M.Eng., M.Inst.R., and the booklet is obtainable from Empire House, St. Martins-le-Grand, E.C.1, price 7s. 6d.

* * *

REPRINTS of an article 'Monoglycerides Finding Wider Uses in Industry' are now available from the Glyco Products Co., Inc., Brooklyn 2, New York.

This describes monoglycerides of the fatty acids such as stearic, oleic, lauric, ricinoleic, etc. Methods of manufacture are discussed. The varying compositions and physical properties which are possible are outlined and a specifications chart to illustrate this is included.

The applications of the monoglycerides in the following industries are noted: food, drug, cosmetic, emulsion, paper, textile, leather, rubber, paint, plastic, resin, ink, polish, detergent, lubricant, photographic, insecticide, adhesive, dye.

* * *

THE F.B.I.'s latest booklet 'Fuel Economy Pays', shows how industry can avoid waste in the use of fuel and, at the same time, often make substantial economies in costs.

Advice given in the booklet is based on the experience of the Federation's Fuel Advisory Service which has been maintained for more than twenty-five years.

In a foreword, Sir Norman Kipping, director-general of the F.B.I., says that, while the F.B.I. will not relax the strenuous efforts it is making to ensure that industry obtains enough fuel and power, industry can do much to help itself by reducing waste.

The booklet, which is divided into three main sections—common faults in boiler operation, the use of instruments for measurement and control, and the efficient use of heat—points to the main causes of waste in fuel and shows how such losses can be avoided.

Many of the suggestions made in the booklet can be carried out without large capital expenditure and with a saving not only in fuel but in cost which is often striking. Copies of the booklet can be obtained from the F.B.I. Technical Department at the price of 2s.

* * *

MORE than 3,500 domestic and foreign patents dealing with pressure hydrogenation—a process for the conversion of coal to oil—are listed in a bulletin compiled by the U.S. Bureau of Mines. The bulletin is Part II of a three-part report on pressure hydrogenation.

Published in October 1950, Part I of this series listed and abstracted all available literature and pertinent data on synthetic liquid fuels research. The final Part III will list patents numerically by countries and will have a detailed index of all material contained in Part I and II.

For several years the Bureau of Mines has carried on a broad programme of research in producing synthetic liquid fuels from coal, oil shale, and other materials. The Bureau is now operating a coal-to-oil demonstration plant at Louisiana, Mo., and an oil-shale mine and demonstration plant at Rifle, Colo.

Copies of Bureau of Mines Bulletin 485, Bibliography of Pressure Hydrogenation, Part II, Patents, can be obtained only from the Superintendent of Documents, United States Government Printing Office, Washington 25, D.C., for $1.00 each. The report was prepared by J. L. Wiley and H. C. Anderson, respectively industrial analyst and technical assistant, Bureau of Mines, Synthetic Liquid Fuels Branch, Pittsburgh, Pa.

Next Week's Events

MONDAY 26 NOVEMBER

Society of Chemical Industry

London: Woolwich Polytechnic, S.E.18, 7.30 p.m. Joint meeting with the London and South Eastern Counties Section, RIC. Dr. F. Wormwell: 'Corrosion Processes—their Cause and Prevention'.

The Chemical Society

Oxford: Physical chemistry laboratory, South Parks Road, 8.15 p.m. Alembic Club Lecture. Dr. R. Spence: 'Chemistry and Atomic Power'.

Institution of Rubber Industry

Manchester: Engineers' Club, Albert Square, 6.15 p.m. Discussion evening.

Congress on Industrial Chemistry

Paris: (until 1 December). Organisers: Société de Chimie Industrielle, 28 Rue St. Dominique, Paris, 7e.

TUESDAY 27 NOVEMBER

Society of Public Analysts

London: Burlington House, Piccadilly, W.1, 6 p.m. Physical Methods Group. Annual general meeting, followed by an address by the retiring chairman, B. S. Cooper, on 'Light Sources in Chemical Analysis and Testing'.

Society of Instrument Technology

London: Manson House, Portland Place, W.1, 6.30 p.m. K. F. H. Murrell (Royal Naval Scientific Service): 'Visual Presentation of Instrument Data'.

WEDNESDAY 28 NOVEMBER

Royal Institute of Chemistry

London: 2.15 p.m. Visit for registered students to A. Boake, Roberts, Ltd., Carpenters Road, E.15.

Institution of Chemical Engineers

London: 2.15 p.m. Graduates' and students' section, visit to Evershed & Vignoles, Ltd., Acton Lane Works, Chiswick, W.4.

Manchester Literary and Philosophical Society (Chemical Section)

Manchester: Portico Library, Moseley Street, 5.45 p.m. A. N. Leather (public analyst for Manchester): 'Good Food, Clean Water and Pure Air'.

Society of Instrument Technology

Manchester: College of Technology, 7.30 p.m. A. R. Aikman: 'The Frequency Response Approach to Automatic Control Problems'.

THURSDAY 29 NOVEMBER

The Chemical Society

Sheffield: The University, 5.30 p.m. Joint meeting with Sheffield University Chemical Society. Professor A. Robertson: 'Natural Complex Pyrylium Bases'.

Royal Institute of Chemistry

London: Acton Technical College, High Street, W.3, 7.30 p.m. Dr. J. B. Gardner: 'Separation of Gases by Low Temperature Methods'.

Society of Leather Trades' Chemists

Northampton: College of Technology, St. George's Avenue, 2.30 p.m. Dr. D. A. Plant: 'Recent Advances in the Chemistry of Chrome Tanning'.

FRIDAY 30 NOVEMBER

Plastics Institute

Manchester: Engineers' Club, Albert Square, 6.45 p.m. N. G. H. Thomas (Monsanto Chemicals, Ltd.): 'A Survey of Polystyrene Development'.

Incorporated Plant Engineers

Birmingham: Imperial Hotel, 7.30 p.m. Frank H. Towler: 'Hydraulics and the Plant Engineer'.

Electrodepositors' Technical Society

Sheffield: Grand Hotel, Sheffield and North East Centre. Open discussion. Chairman: C. Wharrad.

SATURDAY 1 DECEMBER

Institution of Chemical Engineers

Liverpool: Radiant House, Bold Street, 2.30 p.m. North Western Branch. R. B. Peacock: 'Study of Carbide Furnace Operation'.

Birmingham: The University, Edmund Street, 3 p.m. Latin Theatre. Midlands Branch. C. J. Stairmand: 'The Design and Performance of Cyclone Separators'.

Manchester Microscopical Society

Manchester: Geographical Society Buildings, 16 St. Mary's Parsonage, Deansgate, 6 p.m. Annual exhibition.

Society of Leather Trades' Chemists

Manchester: Engineers' Club, Albert Square, 2 p.m. Dr. M. Horwood: 'Industrial Enzymes'.

Chemical & Allied Stocks & Shares

STOCK markets have experienced a further sharp fall of values in nearly all sections, led by a heavy decline in British Funds, which continued to reflect the increase in the Bank rate and talk of the possibility of a further increase in the latter in the near future. The dearer money policy of the Government and the increase in the bank rate to 2½ per cent is an important step against spending and inflation because it makes borrowing dearer, not only for industry but also for the Government and local authorities as well. Nevertheless with money rates higher it is inevitable that gilt-edged stocks, and all other fixed-interest securities, have to be adjusted to a higher yield and consequently lower price basis, and this process has been in evidence in recent weeks. With British Funds showing larger yields, industrial ordinary shares have also moved to a higher yield basis as well. Selling has not been nearly so heavy as might be deduced from the heavy falls in prices in evidence in the past few weeks. The decline in prices has been accentuated by the fact that buyers are showing great caution until the investment outlook can be more clearly assessed.

As was to be expected, shares of chemical and kindred companies have moved back with the general trend on the Stock Exchange. There have been sharp fluctuations in front-ranking shares, such as Imperial Chemical. The latter have relapsed to 48s. 3d. at the time of writing, partly on market talk that more capital may be required, though the City is also talking of share bonus prospects as well. Lever & Unilever fell sharply on the group's big new issue, and were 46s. 3d. 'ex rights' to the new shares. Fisons at 31s. have not responded to the good impression created by the financial results. Monsanto 5s. shares were 26s. 6d., Brotherton 26s. 3d., Albright & Wilson 20s. 6d., British Glues 4s. shares have been active around 15s. and Hardman & Holden were 27s. 6d. Lawes Chemical 10s. shares held steady at 13s. 9d. following publication of the financial results, and Laporte 5s. shares were 11s. 9d. Borax Consolidated eased to 35s. 9d., Turner & Newall relapsed to 92s. 6d., British Xylonite were 87s. 6d. British Industrial Plastics 2s. shares 6s. 4½d. and Erinoid 5s. shares held steady at 10s. on the financial results. Greeff-Chemicals Holdings 5s. shares showed steadiness at 19s.

Glaxo Laboratories at 78s. 9d. were lower despite the good results for the past financial year, and the chairman's review of the company's growing business and big expansion of trade in export markets. Glaxo has big commitments, which may require more capital in due course; and it is being assumed in the market that in the future this may be raised partly by an offer to shareholders of additional shares on favourable terms. Boots Drug 5s. shares were 24s. 3d. and Sangers 19s. 6d. Associated Cement displayed activity, but at 109s. have not held best levels. United Glass have been relatively firm at 87s. 6d. and Triplex Glass 10s. shares were 27s. United Molasses moved back to 36s., and the 4s. units of the Distillers Co. eased to 21s. 9d. Oil shares fluctuated and were generally lower on balance with Anglo-Iranian at £5½. Shell eased to 92s. 6d. although the market is talking of the possibility that the dividend may be raised to 15 per cent, tax free.

On Full Voltage

Professor Philip Dee, Professor of nuclear philosophy at Glasgow University, disclosed on 14 November that the new synchroton in the University atomic research centre was run that day for the first time at its full voltage of 300,000,000 volts. He told the Glasgow Royal Philosophical Society that the synchroton would in the not-distant future be producing a new atomic particle known as mesons in considerable density. This branch of cosmic ray research was being pursued in various American laboratories.

Describing the new synchroton building at Glasgow University, he said that scientists would be housed in a room through which passed beams from the synchroton. When radiation became too intense for safety research would be carried on in an overhead room, by means of instruments lowered through the floor into the chamber below. The harmful beams would be absorbed by a massive concrete wall and tons of earth banked up outside the building.

British Chemical Prices

LONDON.—Active conditions are still being reported for most of the routine industrial chemicals and both home consumers and shippers continue to press for deliveries. New export business for the long sea routes is very severely restricted through lack of shipping space. Buying orders for caustic soda, soda ash and phosphates of soda continue to be heavy and the firmness of prices has been generally maintained with makers experiencing no difficulty in disposing of their full reproduction. A strong undertone persists in the potash chemicals section with spot offers restricted. Acetic anhydride, acetone and other solvents are in steady demand with no important price alterations. Red and white lead prices are unchanged and in active request. In the coal tar products market business continues to be brisk and somewhat above normal and the demand for American cresylic acid is unabated.

MANCHESTER.—Traders on the chemical market during the past week have reported no lack of inquiries covering a wide range of heavy products. The bulk of these have been from home consumers in the textile and other using trades, though there has been a fair number on export account. The alkalis and the ammonia, potash and magnesia compounds are all meeting with a brisk demand. Prices are well maintained throughout the market, with the undertone very firm. Rather more buying interest is being shown in the fertiliser section. In the market for tar products a steady demand for almost all descriptions continues to be reported.

GLASGOW.—After rather a quiet beginning, general business picked up towards the end of the week. Certain branches of the consuming trade are suffering from a dearth of orders and unfortunately, it does not look as if there is any immediate prospect of improvement. This is offset by the fact that other branches are experiencing a continued demand and generally speaking the overall position would appear to be quite sound. The position with regard to exports remains more or less unchanged.

General Chemicals

Acetic Acid.—Per ton : 80% technical, 1 ton, £110 ; 80% pure, 1 ton, £116 ; commercial glacial 1 ton, £130 ; delivered buyers' premises in returnable barrels ; in glass carboys, £7 ; demijohns, £11 extra.

Acetic Anhydride.—Ton lots d/d, £166 per ton.

Acetone.—Small lots : 5 gal. drums, £105 per ton ; 10 gal. drums, £100 per ton. In 40/50 gal. drums less than 1 ton, £85 per ton ; 1 to 9 tons, £84 to £109 per ton ; 10 to 49 tons, £83 to £108 per ton ; 50 tons and over, £82 to £107 per ton.

Alcohol, Industrial Absolute.—50,000 gal. lots. d/d, 4s. 7½d. per proof gallon ; 5000 gal. lots, d/d, 4s. 8½d. per proof gal.

Alcohol, Diacetone.—Small lots : 5 gal. drums, £133 per ton ; 10 gal. drums, £128 per ton. In 40/45 gal. drums : less than 1 ton, £113 per ton ; 1 to 9 tons, £112 per ton ; 10 to 50 tons, £111 per ton ; 50 to 100 tons, £110 per ton ; 100 tons and over, £109 per ton.

Alum.—Loose lump, £17 per ton, f.o.r. MANCHESTER : Ground, £17 10s.

Aluminium Sulphate.—Ex works, £11 10s. per ton d/d. MANCHESTER : £11 10s.

Ammonia, Anhydrous.—1s. 9d. to 2s. 3d. per lb.

Ammonium Bicarbonate.—2 cwt. non-returnable drums ; 1 ton lots £47 per ton.

Ammonium Chloride. — Grey galvanising, £27 10s. per ton, in casks, ex wharf. Fine white 98%, £21 10s. to £22 10s. per ton. See also Salammoniac.

Ammonium Nitrate.—D/d, £18 to £20 per ton.

Ammonium Persulphate. — MANCHESTER : £5 15s. per cwt. d/d.

Ammonium Phosphate.—Mono- and di-, ton lots, d/d, £93 and £91 10s. per ton.

Antimony Sulphide.—Golden, d/d in 5 cwt. lots as to grade, etc., 2s. 6½d. to 3s. 7½d. per lb. Crimson, 4s. to 5s. 4½d. per lb.

Arsenic.—Per ton, £44 5s. to £47 5s., ex store.

Barium Carbonate.—Precip., d/d ; 2-ton lots, £33 5s. per ton, bag packing.

Barium Chloride.—£40 10s. 2 ton lots d/d bags.

Barium Sulphate (Dry Blanc Fixe).—Precip., 4-ton lots, £41 per ton d/d ; 2-ton lots, £41 5s. per ton d/d.

Bleaching Powder.—£19 10s. per ton in casks (1 ton lots).

Borax.—Per ton for ton lots, in free 140-lb. bags, carriage paid: Anhydrous, £59 10s.; in 1-cwt. bags; commercial, granular, £38 10s.; crystal, £42; powder, £43; extra fine powder, £44; B.P., granular, £48 10s.; crystal, £51; powder, £52; extra fine powder £53.

Boric Acid.—Per ton for ton lots in free 1-cwt. bags, carriage paid: Commercial, granular, £68; crystal, £76; powder, £73 10s.; extra fine powder, £75 10s.; B.P., granular, £81; crystal, £88; powder, £85 10s.; extra fine powder, £87 10s.

Butyl Acetate BSS.—£263 per ton, in 10-ton lots.

Butyl Alcohol BSS.—£250 per ton, in 10-ton lots.

Calcium Bisulphide.—£6 10s. to £7 10s. per ton f.o.r. London.

Calcium Chloride.—70/72% solid £9 12s. 6d. per ton, in 4-ton lots.

Charcoal, Lump.—£26 to £28 per ton, ex wharf. Granulated, £35 to £40 per ton.

Chlorine, Liquid.—£28 10s. per ton d/d in 16/17-cwt. drums (3-drum lots).

Chrometan.—Crystals, 6d. per lb.

Chromic Acid.—1s. 10½d. to 1s. 11½d. per lb., less 2½%, d/d U.K.

Citric Acid.—1 cwt. lots, 218s. cwt. 5 cwt. lots, 213s. cwt.

Cobalt Oxide.— Black, delivered, 13s. per lb.

Copper Carbonate. — MANCHESTER: 2s. 6d. per lb.

Copper Chloride.—(63%), d/d, 2s. 9d. per lb.

Copper Oxide.—Black, powdered, about 1s. 4½d. per lb.

Copper Nitrate.—(63%), d/d, 2s. 8d. per lb.

Copper Sulphate.—£103 12s. per ton f.o.b., less 2%, in 2-cwt. bags.

Cream of Tartar.—100%, per cwt., about £12 12s. d/d.

Ethyl Acetate.—10 tons and upwards, d/d, £174 per ton.

Formaldehyde.—£33 per ton in casks, according to quantity, d/d.

Formic Acid.—85%, £66 to £67 10s. per ton, carriage paid.

Glycerine.—Chemically pure, double distilled 1,260 s.g. £14 9s. 0d. per cwt.
Refined pale straw industrial, 5s. per cwt. less than chemically pure.

Hexamine.—Technical grade for commercial purposes, about 1s. 4d. per lb.; free-running crystals are quoted at 2s. 3d. to 2s. 6d. per lb.; bulk carriage paid.

Hydrochloric Acid.—Spot, 9s. 6d. to 10s. 9d. per carboy d/d, according to purity, strength and locality.

Hydrofluoric Acid.—59/60%, about 1s. to 1s. 2d. per lb.

Hydrogen Peroxide.—27.5% wt. £116 per ton. 35% wt. £146 per ton d/d. Carboys extra and returnable.

Iodine.—Resublimed B.P., 20s. 10d. per lb. in cwt. lots.

Iodoform.—24s. 9d. per lb. in cwt. lots.

Iron Sulphate.—f.o.r. works, £3 15s. to £4 5s. per ton. Bags free.

Lactic Acid.—Pale tech., 44 per cent by weight £130 per ton; dark tech., 44 per cent by weight £100 per ton ex works; Usual container terms.

Lead Acetate.—White: £194 10s. per ton.

Lead Carbonate.—Nominal.

Lead Nitrate.—£161 10s. per ton.

Lead, Red.—Basis prices per ton: Genuine dry red lead, £194; orange lead, £206. Ground in oil: red, £215; orange, £227.

Lead, White.—Basis prices: Dry English, in 8-cwt. casks, £200 10s. per ton. Ground in oil: English, under 2 tons, £216 10s.

Lime Acetate.—Brown, ton lots, d/d, £18 to £20 per ton; grey, 80-82%, ton lots, d/d, £22 to £25 per ton.

Litharge.—£194 per ton.

Lithium Carbonate.—7s. 9d. per lb. net.

Magnesite.—Calcined, in bags, ex works, £27.

Magnesium Carbonate.—Light, commercial, d/d, £87 15s.; cwt. lots £97 10s. per ton d/d.

Magnesium Chloride.—Solid (ex wharf), £15 per ton.

Magnesium Oxide.—Light, commercial, d/d, £221; cwt. lots £227 10s. per ton d/d.

Magnesium Sulphate.—£12 to £14 per ton.

Mercuric Chloride.—Per lb., lump, 10s. 8d.; smaller quantities dearer.

Mercury Sulphide, Red.—Per lb., from 10s. 3d. for ton lots and over to 10s. 7d. for lots of 7 to under 30 lb.

Methanol.—Pure synthetic, d/d, £28 to £38 per ton.

Methylated Spirit.—Industrial 66° O.P. 100 gals., 7s. 10d. per gal.; pyridinised 64° O.P. 100 gal., 7s. 11½d. per gal.

Nickel Sulphate.—Deld. buyers U.K. £140 10s. per ton.

Nitric Acid.—£24 to £26 per ton, ex works.

Oxalic Acid.—About £146 per ton, packed in 5-cwt. lots, packed in free 5-cwt. casks.

Paraffin Wax.—Minimum 1-ton lots £76 5s.; smaller quantities £77.

Phosphoric Acid.—Technical (S.G. 1.500), ton lots, carriage paid, £75 10s. per ton; B.P. (S.G. 1.750), ton lots, carriage paid, 1s. 5½d. per lb.

Potash, Caustic.—Solid, £88 10s. per ton for 1-ton lots; flake, £105 per ton for 1-ton lots. Liquid, d/d, nominal.

Potassium Bichromate.—Crystals and granular, 10¾d. per lb.; ground, 11¾d. per lb., for not less than 6 cwt.; 1-cwt. lots, ¼d. per lb. extra.

Potassium Carbonate.—Calcined, 98/100%, £88 10s. per ton for 1-ton lots, ex store; hydrated, £81 for 1-ton lots.

Potassium Chlorate.—Imported powder and crystals, nominal.

Potassium Chloride.—Industrial, 96%, 6-ton lots, £16 10s. per ton.

Potassium Iodide.—B.P., 18s. 7d. per lb. in 28 lb. lots.

Potassium Nitrate.—Small granular crystals, 81s. per cwt. ex store, according to quantity.

Potassium Permanganate.—B.P., 1s. 7½d. per lb. for 1-cwt. lots; for 3 cwt. and upwards, 1s. 6½d. per lb.; technical, £8 3s. per cwt.; for 5 cwt. lots.

Potassium Prussiate.—Yellow, nominal.

Salammoniac.—Dog-tooth crystals, £72 10s. per ton; medium, £67 10s. per ton; fine white crystals, £21 10s. to £22 10s. per ton, in casks.

Salicylic Acid. — MANCHESTER: Technical 2s. 7d. to 2s. 10d. per lb. d/d.

Soda Ash.—58% ex depôt or d/d, London station, £8 17s. 3d. to £10 14s. 6d. per ton.

Soda, Caustic.—Solid 76/77%; spot, £21 12s. 6d. per ton d/d. (4 ton lots).

Sodium Acetate.—£85 to £91 per ton d/d.

Sodium Bicarbonate.—Refined, spot, £11 per ton, in bags.

Sodium Bichromate.—Crystals, cake and powder, 9d. per lb.; anhydrous, 9¼d. per lb., net, d/d U.K. in 7-8 cwt. casks.

Sodium Bisulphite.—Powder, 60/62%, £40 per ton d/d in 2-ton lots for home trade.

Sodium Carbonate Monohydrate.—£25 per ton d/d in minimum ton lots in 2-cwt. free bags.

Sodium Chlorate.—£87 to £95 per ton.

Sodium Cyanide.—100% basis, 8d. to 9d. per lb.

Sodium Fluoride.—D/d, £4 10s. per cwt.

Sodium Hyposulphite.—Pea crystals £28 a ton; commercial, 1-ton lots, £26 per ton carriage paid.

Sodium Iodide.—B.P., 20s. 1d. per lb., in 28 lb. lots.

Sodium Metaphosphate (Calgon).—Flaked, loose in metal drums, £123 ton.

Sodium Metasilicate.—£21 5s. per ton, d/d U.K. in ton lots.

Sodium Nitrate.—Chilean Industrial, 97-98%, 6-ton lots, d/d station, £29 15s. per ton.

Sodium Nitrite.—£29 12s. 6d. per ton.

Sodium Percarbonate.—12½% available oxygen, £8 4s. per cwt. in 1-cwt. drums.

Sodium Phosphate.—Per ton d/d for ton lots: Di-sodium, crystalline, £37 10s., anhydrous, £78 10s.; tri-sodium, crystalline, £39 10s., anhydrous, £75 10s.

Sodium Prussiate.—10d. to 10½d. per lb. ex store.

Sodium Silicate.—£6 to £11 per ton.

Sodium Silicofluoride.—Ex store, nominal.

Sodium Sulphate (Glauber Salt).—£8 per ton d/d.

Sodium Sulphate (Salt Cake).—Unground. £6 per ton d/d station in bulk. MANCHESTER: £6 10s. per ton d/d station.

Sodium Sulphide.—Solid, 60/62%, spot. £27 per ton, d/d, in drums; broken, £27 15s. per ton, d/d, in drums.

Sodium Sulphite.—Anhydrous, £57 12s. 6d. per ton; pea crystals, £36 7s. 6d. per ton d/d station in kegs; commercial, £22 per ton d/d station in bags.

Sulphur.—Per ton for 4 tons or more, ground, £25 18s. 6d. to £28 8s. according to fineness.

Tartaric Acid.—Per cwt.: 10 cwt. or more, £15 10s.

Tin Oxide.—1-cwt. lots d/d £25 10s. (Nominal.)

Titanium Oxide.—Comm., ton lots, d/d (56-lb. /112 lb. bags), £115 per ton.

Zinc Oxide.—Maximum price per ton for 2-ton lots, d/d; white seal, £207 10s.; green seal, £206 10s.; red seal, £205.

Zinc Sulphate.—Nominal.

Rubber Chemicals

Antimony Sulphide.—Golden, 2s. 6½d. to 3s. 7½d. per lb. Crimson, 4s. to 5s. 4½d. per lb.

Arsenic Sulphide.—Yellow, 1s. 9d. per lb.

Barytes.—Off colour, ex store. Imported £13 10s per ton. Extra white bleached ex store, £16 10s.

Cadmium Sulphide.—About 20s. per lb.

Carbon Bisulphide.—£65 5s. per ton, according to quality.

Carbon Black.—6d. to 8d. per lb., according to packing.

Carbon Tetrachloride.—£69 10s. per ton.

Chromium Oxide.—Green, 2s. per lb.

India-rubber Substitutes.—White, 1s. 9⅝d. to 2s. 3d. per lb. ; dark, 1s. 8¼d. to 2s. 1¼d. per lb.

Lithopone.—30%, £75 15s. per ton.

Mineral Black.—£7 10s. to £10 per ton.

Mineral Rubber, 'Rupron.'—£20 per ton.

Sulphur Chloride.—British 48s. 6d. per cwt.; Imported £120 per ton.

Vegetable Lamp Black.—£49 per ton.

Vermilion.—Pale or deep, 15s. 6d. per lb. for 7-lb. lots.

Nitrogen Fertilisers

Ammonium Sulphate.—Per ton in 6-ton lots, d/d farmer's nearest station, £15 7s. 6d.

Compound Fertilisers.—Per ton d/d farmer's nearest station, I.C.I. Special No. 1, £25 19s. 6d.

'Nitro-Chalk.'—£12 9s. 6d. per ton in 6-ton lots, d/d farmer's nearest station.

Sodium Nitrate.—Chilean agricultural for 6-ton lots d/d nearest station, £29 15s. per ton.

Coal-Tar Products

Benzol.—Per gal, ex works : 90's, 3s. 8¼d. ; pure, 3s. 11½d. ; nitration grade, 4s. 2½d.

Carbolic Acid.—Crystals, 1s. 6d. to 1s. 8d. per lb. Crude, 60's, 8s. MANCHESTER : Crystals, 1s. 6¼d. to 1s. 8d. per lb., d/d crude, 5s. 9d., naked, at works.

Creosote.—Home trade, 10d. to 1s. 2d. per gal., according to quality, f.o.r. maker's works. MANCHESTER : 9½d. to 1s. per gal.

Cresylic Acid.—Pale 98%, 5s. 8d. per gal. ; 99.5/100%, 5s. 10d. American, duty free, for export, 10s. naked at works.

Naphtha.—Solvent, 90/160°, 4s. 2½d. per gal. for 1000-gal. lots ; heavy, 90/190°, 3s. 8d. per gal. for 1000-gal. lots, d/d. Drums extra : higher prices for smaller lots.

Naphthalene.—Crude, ton lots, in sellers' bags, £18 2s. 3d. to £29 5s. 9d. per ton according to m.p. ; hot-pressed, £50 to £60 per ton, in bulk ex works ; purified crystals, £60 to £70 per ton. F.O.B.

Pitch.—Medium, soft, home trade, 130s. per ton f.o.r. suppliers' works ; export trade, 200s. per ton f.o.b. suppliers' port. MANCHESTER : £6 10s. f.o.r.

Pyridine.—90/160°, 35s. per gal. MANCHESTER : 35s. to 40s. per gal.

Toluol.—Pure, 4s. 7½d. per gal. MANCHESTER : Pure, 4s. 7½d. per gal. naked.

Xylol.—For 1000-gal. lots, 5s. 1½d. per gal., according to grade, d/d.

Wood Distillation Products

Calcium Acetate.—Brown, £15 per ton ; grey, £22.

Methyl Acetone.—40/50%, £56 to £60 per ton.

Wood Creosote.—Unrefined, from 3s. 6d. per gal., according to boiling range.

Wood Naphtha.—Miscible, 4s. 6d. to 5s. 6d. per gal. ; solvent, 5s. 6d. to 6s. 6d. per gal.

Wood Tar.—£6 to £10 per ton.

Intermediate and Dyes (Prices Nominal)

m-**Cresol** 98/100%.—3s. 9d. per lb. d/d.

o-**Cresol** 30/31° C.—1s. 4d. per lb. d/d.

p-**Cresol** 34/35° C.—3s. 9d. per lb. d/d.

Dichloraniline.—2s. 8½d. per lb.

Dinitrobenzene.—8½d. per lb.

Dinitrotoluene.—48/50° C., 9½d. per lb. ; 66/68° C., 1s.

p-**Nitraniline.**—2s. 11d. per lb.

Nitrobenzene.—Spot, 5½d. per lb. in 90-gal. drums, drums extra, 1-ton lots d/d buyers' works.

Nitronaphthalene.—1s. 2d. per lb. ; P.G. 1s. 0½d. per lb.

o-**Toluidine.**—1s. per lb., in 8/10-cwt. drums, drums extra.

p-**Toluidine.**—2s. 2d. per lb., in casks.

m-**Xylidine Acetate.**—4s. 5d. per lb., 100%.

Commercial Intelligence

The following are taken from the printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described herein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages or Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

AMBER PHARMACEUTICALS LTD. (formerly Chemisynthetics Ltd.), London, S.W. (M., 24/11/51). 2 October, charge, to Swiss Bank Corporation, securing all moneys due or to become due to the Bank; charged on Smithies Mill, Batley, with fixtures. *Nil. 14 June, 1951.

BRITISH ALUMINIUM CO. LTD., London, E.C. (M., 24/11/51.) 28 September, disposition with consent, granted in implement of a Trust Deed dated 30 July, 1947, and supplemented deed dated 10 November, 1948; charged on Glendarnock, Greenmount Road, Burntisland. *£5,000,000. 15 May, 1951.

PHOTO-CHEMICAL CO. LTD., London, W.C. (M., 24/11/51.) 8 October, series of £11,000 debentures present issue £1,000; general charge. *Nil. 31 December, 1950.

Increases of Capital

The following increases of capital have been announced:—WARRICK BROTHERS, LTD., from £20,000 to £25,000.

T. & H. SMITH, LTD., from £400,000 to £750,000.

Company News

International Nickel Co.

The report of The International Nickel Company of Canada, Limited, and subsidiaries for the three months ended 30 September, 1951, issued by Dr. John F. Thompson, chairman and president, shows net earnings in terms of U.S. currency of $16,349,814 after all charges, depreciation, depletion, taxes, etc., equivalent, after preferred dividends, to $1.09 per share on the common stock.

In the three months ended 30 June, 1951, net earnings were $14,653,656, equal to 97c a share on the common and in the third quarter of 1950 net earnings were $13,534,752, or 90c a common share.

For the nine months ended 30 September, 1951, net earnings were $45,734,860, equal to $3.03 a share on the common, compared with $33,920,343, or $2.23 a common share, in the corresponding period a year ago.

Quaternary Ammonium Halide

OF great interest in the bactericidal field is the new family of disinfectants that has sprung up in the past few years—the quaternary ammonium halides. These compounds, the bactericidal action of which was first discovered in 1935, constitute a revolution in disinfectants, being almost completely non-toxic, and at the concentrations at which they are used, tasteless,, non-corrosive odourless, colourless and absolutely harmless. The British Hydrological Corporation, which manufactures them at Merton, London, S.W.19, has recently (since 1947) been making these compounds with two long hydrocarbon chains attached to the nitrogen instead of one, following the discovery that this conferred upon them non-foaming properties of importance in bottle-washing, without in any way impairing the bactericidal properties of the compound. In fact, the latest development—didecyldimethyl ammonium bromide, or 'Deciquam'—*increases* its power with an increase or decrease in *p*H, and is effective at concentrations of from 1:5,000 to 1: 15,000 against both gram-positive and gram-negative organisms. Rideal-Walker coefficients are no longer used for assessing the killing power of quaternary ammonium compounds, and this is another reason for revising the whole system of testing disinfectants (*see* CHEMICAL AGE, 6 October, 1951).

Examining Nuisance

After complaints from the town's Chamber of Trade and two residents about dust and fumes from a local cement works, an Alkali Works Inspector visited Buckley at the request of the Urban Council on 13 November to carry out a preliminary investigation. He met a deputation of councillors and heard their views. Mr. Frank Roberts, chairman, at the council meeting said that the matter was being investigated in detail by the inspector, and samples of the nuisance would be submitted for examination to experts before a final report was issued.

Air conditioning for car body spraying at Messrs. Fisher & Ludlow Ltd., Erdington

Does air conditioning affect output?

IN VERY MANY TRADES it does. Where consistent quality depends on constant temperature and humidity, air conditioning is the only way to ensure a low rejection rate. In others, where fumes or dust can mar the work, conditioned air is sometimes essential, and often desirable. Modern air conditioning plant provides predetermined air conditions in large or small spaces and is fully automatic. It is one more example of electricity used efficiently to maintain the level of production.

WHERE TO GET MORE INFORMATION

Your Electricity Board will be glad to help you to get the utmost value from the available power supply. They can advise you on ways to increase production by using Electricity to greater advantage — on methods which may save time and money, materials and coal, and help to reduce load shedding. Ask your Electricity Board for advice: it is at your disposal at any time.

Electricity for PRODUCTIVITY

Issued by the British Electrical Development Association

CLASSIFIED ADVERTISEMENTS

SITUATIONS VACANT

INDUSTRIAL CHEMIST required by the Division of Atomic Energy (Production), Risley to interpret basic chemical research to engineers engaged in the design of chemical plants and to advise on the design of these plants.

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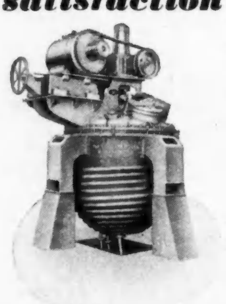

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